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GENERAL MEDICAL COUNCIL.



REPORT OF THE COMMITTEE

ON

PROFESSIONAL EDUCATION (1869),

WITH

THREE APPENDICES.

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REPORT.

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APPENDIX II.—Containing Reports of the Medical Teachers' Association, and a Report on the Systems of Medical Education in North Germany, Austria, and France.

APPENDIX III.—Observations on Medical Education, by Dr. Christison.

REPORT.

At a Meeting held on June 26, 1868, the Medical Council passed the following Resolution (Minutes, vol. vi., p. 189) :—

> "That a Committee be appointed to consider and report how the various subjects of Medical Education which have been deemed requisite by the Council may be taught with most advantage; in what order they should be studied; and how the Examinations on them ought to be arranged."

A Committee (consisting of Mr. SYME as Chairman, and of Dr. ANDREW WOOD, Mr. HAWKINS, Dr. ACLAND, Dr. ALLEN THOMSON, Dr. AQUILLA SMITH, Mr. HARGRAVE, Dr. APJOHN, Dr. SHARPEY, Dr. CHRISTISON, and Dr. PARKES, as members) being appointed, found that the various subjects of Medical Education deemed requisite by the Council had been fixed by a resolution of Council (June 7, 1867, Minutes, vol. v., p. 238), and were ten in number—viz.: Anatomy, General Anatomy, Physiology, Chemistry, Materia Medica, Practical Pharmacy, Medicine, Surgery, Midwifery, and Forensic Medicine.

The Medical Council had also fixed a term of four years as the period which should be occupied with Medical Education before the examination for the licence should be undergone.

In accordance with these resolutions, we addressed the following letter to various teachers who, we thought, would give us the best information. We were not able to address it to all teachers, but we endeavoured to obtain answers from all parts of the kingdom, so that every mode of teaching and every large school might have its representative.

OFFICE OF THE GENERAL COUNCIL OF
MEDICAL EDUCATION,
32, SOHO SQUARE, LONDON, W.
July, 1868.

SIR,

A Committee of the Medical Council has been appointed to inquire "how the various subjects of Medical Education which have been deemed requisite by the Council may be taught with most advantage; in what order they should be studied; and how the Examinations on them ought to be arranged."

By the recommendation of the Medical Council, four years are to be devoted to the study of the ten following subjects, namely: 1—Anatomy; 2—General Anatony; 3—Physiology; 4—Chemistry; 5—Materia Medica; 6—Practical Pharmacy; 7—Medicine; 8—Surgery; 9—Midwifery; 10—Forensic Medicine. There must, therefore, be a limit to the extent and detail in which the several branches can be taught.

The above inquiry is restricted to the course of study which is necessary to enable students to obtain the requisite knowledge and skill for the efficient practice of their profession, and is not intended to embrace the fuller courses of study suited for the higher qualifications.

Having regard to the nature of the inquiry and circumstances, as above stated, the Committee would feel obliged by your communicating to them in writing the expression of your opinion on the following points:—

1. The topics which may most advantageously be included under the subject of ————.
2. The period in a four-years' course when ——— can be most profitably studied, and the length of time which should be devoted to ——— ———.
3. The manner in which ——— can best be taught—by lectures, practical instruction, or otherwise.

The Committee would also feel obliged by any further observations or information which may occur to you as deserving of attention in connection with the subject of their inquiry.

The Committee beg leave to express their hope that the importance of the subject in question will induce you to forgive the trouble thus proposed, and that you will transmit your reply to me at the above address, on or before the 1st of October, 1868.

I am, SIR,
Your obedient Servant,
(Signed) JAMES SYME,*
Chairman of Committee.

* On Mr. Syme's retirement from the Council, Dr. Andrew Wood was chosen as Chairman.

We have to express our thanks to the 131 gentlemen who have kindly complied with our request, and who have given us information of great value on the best modes of Medical Education. Their names are given in Appendix No. I., where all the replies are placed under the several headings. In a Second Appendix we have placed three documents. The first is a Report from the Council of the Medical Teachers' Association of London; the second is one from the Association itself, based on the former Report; the third document is an abstract of the systems of Medical Education in North Germany, Austria, and France, by Dr. Beigel, and the late Mr. Alexander Bruce, who drew up at our request an abstract giving a general view of the system of Medical Education in those countries. The Third Appendix contains Observations on Medical Education, by Dr. Christison.

We will not occupy space by analyzing this evidence, or by enumerating the defects in Medical Education which are noticed in many of the answers. There can be no doubt that during the last fifteen or twenty years very considerable progress has been made in the improvement both of medical teaching and examinations. The Licensing Boards have shown a laudable anxiety to further this object; the Medical Council has not been remiss in urging it forward, and there has certainly been a great improvement in the knowledge of practitioners throughout the country. It must be admitted, however, that there is room for improvement, and we trust the Council will find no difficulty in coming to an expression of opinion which will be satisfactory to the profession, and will conduce to the benefit of the public at large.

The Council by its resolution appointing the Committee did not intend to inquire into, or in any way to consider the higher Medical qualifications given by the Universities or Corporations. The course of study, the method of examination, and the qualifications necessary to insure that the public should be supplied with a properly-educated and trustworthy body of general Medical practitioners, are the points we have had in view.

It will be convenient to arrange our report nearly in the order of the Resolutions of the Council.

I.—The Subjects deemed Requisite by the Council.

1. The General Medical Council, by its resolution of June 7, 1867 (Minutes, vol. v., p. 237), excluded Botany from the curriculum of subjects; and, consequently, we did not include it in our inquiry. But we are not satisfied that this matter has been sufficiently considered, and we advise that it shall be again discussed by the Council, and that an opinion shall be once more given as to whether a knowledge of Botany is or is not necessary for a Medical practitioner. If the decision be the same as before, the matter is ended; if the Council, however, after renewed consideration, declares Botany to be necessary, it must be determined whether it shall be studied before the commencement of Medical studies, *i.e.*, be made a compulsory subject at the Preliminary or Entrance Examination, or shall be included among the subjects taught in the four years of the Medical curriculum. If the Council decides that Botany shall be studied before Medical Education is commenced, it ought to take measures to satisfy itself that the kind and amount of knowledge which it deems necessary is really attained, and that the examination which the Council accepts as a proof of knowledge is properly conducted.

We pass no opinion on this point, but a resolution will be moved for the purpose of bringing it once more under discussion in the Council.

2. A question has been raised as to Chemistry. Some gentlemen who have replied to our letter have suggested that Chemistry shall be a preliminary subject, *i.e.*, shall be learnt before the commencement of Medical studies, and a year is named as the time during which it should be studied. This suggestion involves more than it professes to do. If a year is to be given up to Chemistry it will really be nothing more nor less than a year of the Medical curriculum, to which it will be added, or from which it will be taken.

Another plan has been proposed by the Medical Teachers' Association and others. Surrendering the proposal to make Chemistry entirely preliminary, it is still thought that Elementary Chemistry might be made a compulsory subject of the Preliminary

Examination of general education, and it is, we presume, anticipated that the Medical curriculum would be thereby lightened.

The matter seems to us to stand thus: Chemistry is so important, indeed so necessary for good Medical training, and is so interwoven, as it were, with Physiology, Pathology, Dietetics, and Medical practice, that we have no doubt it must be thoroughly studied during the Medical curriculum; and even if we could look forward to a time when the study of Chemistry in our general schools would render this unnecessary, we are sure that that time is yet far distant. But if it were possible to secure for the student some previous knowledge of Chemistry, it would doubtless aid both him and his teacher. However, by making Elementary Chemistry a compulsory subject of the Preliminary Examination, we fear the Council, in the present state of general education, would put itself in this dilemma: either such a Preliminary Examination of Chemistry would be worthless, or if severe enough to be a test, it would impose a study out of the range of ordinary schools, and might therefore prevent some persons from entering the profession, or would add to the expense of Medical Education.

At the same time, the fact of the Medical Council placing Elementary Chemistry among the compulsory subjects of the Preliminary Examination would give a powerful impetus to its study in general schools throughout the country, and in this way the proposed regulation would be useful; but it could not be looked upon as likely to lessen at present the amount of Chemical instruction in the Medical schools. We shall bring forward a resolution to take the sense of the Council in this matter.

3. The subject of Zoology was not included by the Council among the necessary subjects. It has been suggested it should be so, but in this we cannot agree. Zoology may very properly be demanded from those who take the higher qualifications; but there are already sufficient subjects, more directly related to his future duties, to be studied by the student intended for general Medical practice.

4. The ten subjects enumerated by the Council are obviously essential, but we think it would conduce to efficient teaching if

some of these subjects were again divided. We would propose to add to Chemistry, Medical, *i.e.* Physiological and Pathological Chemistry, so as to carry out the definition of the Council (Minutes, vol. v., p. 237), "That Chemistry should include those details of the science which bear on the study of Medicine." It is also expedient that Physics should henceforth be made a separate branch of study. The Council has separately enumerated Materia Medica and Practical Pharmacy, but we propose also a further division into Therapeutics, and would employ the term Pharmacy in place of Materia Medica, which is a generic word, including Pharmacy and Therapeutics. So also, Pathological Anatomy should be made a separate division, as is suggested indeed by the Council (Minutes, vol. v., p. 238), and Hygiene should be added.

The Council will understand that these changes do not really increase the number of subjects, and do not necessarily add to the number of lectures and to the student's work: he is supposed at present to learn all of these; but the division enables a more complete view of what is taught, and also a better order of tuition to be attained.

The list of subjects will therefore stand as follows:—

1. Physics.
2. Chemistry.
3. Medical Chemistry.
4. Anatomy.
5. General Anatomy.
6. Physiology.
7. Pharmacy.
8. Therapeutics.
9. Medicine.
10. Surgery.
11. Pathological Anatomy.
12. Midwifery.
13. Forensic Medicine.
14. Hygiene.

II.—The Order in which these Subjects should be Taught.

5. The nature of the subjects at once fixes a certain order. Anatomy, Chemistry, and Physiology must necessarily precede Medicine, Surgery, and Midwifery.

The rules of the various Licensing Bodies have already sanctioned the division, and in accordance with their regulations, and in order to prevent confusion, it is clearly desirable not to mix up what may be termed the preparatory and the practical subjects.

The rules and the periods of the examination of almost all the Licensing Bodies are in accordance, and the North German Permissive Plan, as given in Appendix II., is the same in principle.

6. It will be observed that in some of the replies it is recommended that students should be encouraged to attend the hospital and gain what practical knowledge they can from the very commencement of their studies. This is a matter on which there is a difference of opinion; but provided a student does not neglect the studies which are enjoined, and does not interfere with the hospital work of the older students, he might voluntarily attend the hospital throughout his whole period of study. But we are of opinion he should not be compelled to attend until a certain date.

7. If the total period of study be four years, what length of time should be occupied with the two series of subjects into which Medical Education can be divided?

Several teachers suggest that the Annus Medicus should begin in the summer, and not in the winter. The suggestion is worthy of attention, because in the first summer session there is sufficient time to go over several preparatory subjects. It does not, however, enable the line between the two classes of subjects to be so well drawn as in the year beginning with the winter session. It has also been suggested that the length of the winter session should be shortened to four and a-half or five months, and that of the summer session lengthened to four or four and a-half months. It would be well for the Council to ascertain from the several Licensing Bodies if there would be any decided advantages or any difficulties in such an arrangement.

If the Medical year begins in October or November, as at present, the following scheme seems to us to arrange the subjects in a satisfactory manner, and with a length proportionate to their importance, and to include, as far as we can manage it, the views of those who have best considered the matter. It will be

understood that this scheme is merely to show the practicability of the arrangement, and not to lay down a course to be invariably followed.

First Winter Session.

Physics (by a separate teacher).
Chemistry.
Practical Chemistry, Qualitative (in the last three months).
Anatomy and Dissections.

First Summer Session.

Medical Chemistry, viz.: Physiological and Pathological Chemistry, including Chemistry of Poisons.
General Anatomy, including the practical study of Minute Anatomy and Histology.
Botany (if included in the curriculum).
Pharmacy and Practical Pharmacy.

Second Winter Session.

Anatomy.
Dissections.
Physiology (by lectures and practical study).
First Examination for the Licence in Anatomy, Physiology, Chemistry, Pharmacy, &c., to be undergone at the end of the second winter session, or eighteen months after the commencement of Medical studies.

By this plan, a distinct separation is made between the preparatory and practical subjects, and sufficient time is given for the latter. The only subject included which is not truly preparatory is Pathological Chemistry, but it is convenient at present to place that subject with Physiological Chemistry, of which it can easily be made an offshoot.

Second Summer Session.

Hospital Practice, with initiatory Clinical instruction in Medicine and Surgery.

Third Winter Session.

Systematic Lectures on Medicine and Surgery.
Hospital Practice and Clinical Lectures.

Third Summer Session.

Therapeutics.
Pathological Anatomy.
Hospital Practice and Clinical Lectures.
Operative Surgery.

Fourth Winter Session.

Midwifery and Diseases of Women and Children, and Practical Midwifery.
Hospital Practice and Clinical Lectures.
(Special Instruction in Diseases of the Eye, Ear, Teeth, in Vaccination, in Mental Diseases, &c.)

Fourth Summer Session.

Forensic Medicine.
Hygiene.
Hospital Practice and Practical Midwifery.

Final Examination for the Licence in Therapeutics, Medicine, Surgery, Midwifery, Forensic Medicine, and Hygiene.*

* If the Annus Medicus began in the summer session, the following might be the order of the subjects. In this arrangement the advantage is gained of occupying the first summer session with preparatory teaching, which will prepare the student properly for the more advanced courses of the following session.

First Summer Session.

Physics.
Chemistry (Elementary).
Osteology.
Botany (if included in the curriculum).

First Winter Session.

Anatomy and Dissections.
Chemistry and Practical Chemistry.

Second Summer Session.

Medical Chemistry, viz., Physiological and Pathological Chemistry.
General Anatomy and Microscopy.
Pharmacy and Practical Pharmacy.

Second Winter Session.

Anatomy and Dissections.
Physiology (by lectures and practical study).

(First Examination.)

Third Summer Session.

Initiatory Surgical Instruction in Practical and Operative Surgery.
Initiatory Medical Instruction in Methods of Examination and Diagnosis.
Hospital Practice.

Third Winter Session.

Lectures on Medicine.
„ „ Surgery.
Pathological Anatomy.
Hospital Practice and Clinical Lectures.

Fourth Summer Session.

Midwifery and Practical Midwifery.
Therapeutics.
Forensic Medicine.
Hospital Practice and Clinical Lectures.

Fourth Winter Session.

Diseases of Women and Children.
Practical Midwifery.
Special Hospital Instruction in Diseases of the Eye, Ear, Mind, in Vaccination, &c.
Hospital Practice and Clinical Lectures.
Hygiene.

(Second Examination.)

8. In arranging this order it will be seen that we have aimed in the first division at the following points: that the student should study Anatomy and dissect in two winter sessions,—but we do not desire to see the same course of Anatomy repeated; that Chemistry should be taught as a science, and practically, in the first winter session, and that its applications to Medicine should follow immediately in the next summer session, because in subsequent years, when the hospital would be attended, there would be no time to perform laboratory work; and that Physiological Chemistry and General and Minute Anatomy should precede advanced Physiology, to which these subjects are necessarily an introduction. It will be noticed that in several of the replies from Anatomical teachers, it is recommended that Anatomy be studied for three or even four years. We are fully impressed with the value of Anatomy, but it must be remembered there are other subjects equally important, and that time must be allowed for them. Anatomy is, therefore, recommended to be studied for eighteen months, and Chemistry and Physiology for a year.

If the Examination is conducted at the end of the second winter session, the time would be convenient for obtaining Anatomical subjects.

9. In the second division, the only alteration which calls for remark is the time allotted to Midwifery. It will be seen from the evidence in the Appendix that several of the best Midwifery teachers would place that subject in the third year; but we believe that it will really be better, first to teach general Medicine and Surgery, and besides continuing the study of these, to let the last twelve months be also occupied with Midwifery and with special classes of disease, on which particular instruction is much needed, as, for example, Diseases of Women and Children, Mental Affections, Ophthalmology, &c. We are decidedly of opinion that the present space allotted to Midwifery in the regulations of some of the Licensing Bodies is too short, and that, as was formerly the case, it should extend over one winter session, and that instruction in practical Midwifery should also be extended.

III.—The Method of Teaching these several Subjects.

10. Some apprehension has been expressed lest the Council might lay down rules as to methods of teaching, which might too much limit the freedom of teachers. We do not think that the Council is likely to do this, to any greater degree than has always been done by the Medical Corporations.

We have placed in our Appendix the opinion on every subject of a large number of the teachers best qualified to judge; and we think it will be the wisest course to allow these opinions gradually to produce their effect on the method of teaching. Time will show whether it will be advantageous for the Council to discuss more fully special modes of tuition in all or certain subjects.

We are of opinion, however, that there are certain general rules which should be enforced.

11. For many years Practical Chemistry has been compulsory; but the answers of the eminent chemists whom we consulted show that Chemistry must be still more practically dealt with, and some even recommend the discontinuance of formal Chemical lectures. We are not prepared to adopt this latter recommendation, but we have no doubt the Laboratory work should be much more carefully done, while the systematic lectures might probably be more restricted.

12. Then, with respect to the application of Chemistry to Physiology and Pathology (a point of the highest importance), we have no doubt the instruction should be chiefly practical, and should take place in a museum and laboratory, after the Chemical course has been gone through.

13. In Pharmacy the instruction should largely consist of demonstrations or examinations in a museum, and be as practical as possible, while opportunities for learning must be given both in a Pharmaceutical laboratory and by practical dispensing.

14. With regard to Anatomy, whilst we have not thought it requisite to make any division of the subject beyond what has already been done by the Council, we think it desirable to direct

the attention of teachers to the great importanee of devoting partieular attention to those departments of the study which have most direct relation to Medieal and Surgical practice.

15. Minute (including microscopic) Anatomy is, in some parts of the kingdom, considered to belong to the Anatomieal course, while in other places it is included in the Physiological. We believe this latter view to be correct, and we would advise that the Anatomical leeturer shall not inelude in his eourse General and Minute Anatomy; but we also consider these subjects should be separated from the advanced Physiologieal lectures, and be studied previously, but under the supervision of the Physiological teacher.

16. Finally, in regard to hospital practice, without eneroaching on the systems preferred by individual physieians and surgeons, we may state there is an urgent need of improving practieal hospital training in many schools. The replies on this head in the Appendix are of great value. We believe that not only practical hospital classes in Medicine and Surgery should be more commonly instituted than at present, but that every student should perform the duty of elerk and dresser, even if the time now oecupied in these offiees were shortened, and the amount of work done by each clerk or dresser lessened. At present, in our large schools, there are many students who never have the opportunity of practical work of this kind, which they may be called on to perform the day after they have passed their examinations. But it is surely proper that the amount of hospital instruction, whatever may be its extent, should be equally proportioned among all those who pay their fees, in the faith of reeeiving their share of this instruction. It only requires more system and a proper use of the various departments of an hospital (both the in and out-patient departments), and division of the students among them, to ensure that every student shall get the full benefit whieh his hospital is capable of giving him. In addition, the opportunities of instruetion afforded by hospitals, infirmaries, and dispensaries which are not attaehed to medical sehools, should be taken advantage of.

17. There is one matter, however, in respect of teaehing, which

the Medical Council may not only properly regulate, but is urgently called on to do so. We refer to the extent to which the teaching of each subject is to be carried.

Whoever will consider the great extent of the sciences which lie at the foundation of Medicine and Surgery, and indeed, in the present day, the extent of the practical parts of Medicine and Surgery, will see that some limit must be assigned to the amount of knowledge which can be fitly exacted.

The Committee is aware that teaching may in some subjects be carried to such an extent as to throw unnecessary difficulties in the way of the candidate for a general licence. We do not think it expedient to interfere directly by regulation with this matter, but we are of opinion that all that is necessary may be accomplished through the examinations.

With this view, we recommend that the various Licensing Bodies be requested to state the extent and nature of the examinations which they require in the different subjects of the curriculum. We further recommend, that on receiving these statements, the Council shall compile a set of rules, which will indicate the most important parts of each subject, and serve as a guide to teachers, *in so far as applies to the preparation of the candidates for the licence.* These rules can be revised from time to time, as the subjects advance and the modes of teaching improve.

In this way the examinations in the three divisions of the kingdom will be made much more uniform; Medical students intended for general practice will know more precisely how far they must learn, and within what limits an exact knowledge may reasonably be demanded from them.

IV.—Arrangement of the Examinations.

18. This was the last point referred to us by the Council, and we understand the reference to mean—how the examinations of all kinds may be conducted, so as to answer the effect of allowing no one to enter on general Medical practice who is not fully competent.

It will be seen that we have not adopted the view of the Medical Teachers' Association, that there should be three professional examinations, viz., at the end of the first year, of the second year, and of the fourth year. There is a disadvantage in having so many examinations, as regards both students and examiners, and the objects of the Association can be, we think, met by placing the school examinations on a better basis.

19. We would propose, then, two examinations by the Licensing Bodies as heretofore, the first a primary examination, embracing Anatomy, Chemistry, Physiology, and Pharmacy, at the end of the second winter session, and the second or pass examination, including all the other subjects, at the end of the fourth year.

20. But we would propose to prepare for these examinations by having more regular class examinations. The Medical Council has on several occasions expressed its wish that the class examinations should be more thoroughly conducted than they now are, at least in most cases, and we propose that the Council should now give effect to its suggestion.

With this object we would propose that no certificate of attendance on a course of instruction be accepted as valid by a Licensing Body, unless it attests that the student has been duly examined during the progress of such course, and especially at its termination. In this way each student may learn from his teacher the degree of proficiency he has attained in a given branch of study.

21. The professional examinations of the Licensing Bodies have been already repeatedly inspected by the Medical Council, and improvements which will make them more efficient tests have been and are being gradually introduced. Still the examinations are not quite satisfactory, and we recommend that the Council should continue their visitations from time to time, and should watch over the working of the plans they have seen in action, and above all, that the Council should see that every part of the system of instruction be fully tested. The scope of the examination for the licence ought, in fact, to include every part of the work done in the schools, practical or otherwise. Especial attention should be paid

by the Council to the necessity of requiring in all cases that the clinical examination of Surgical and Medical patients shall form part of the pass examination.

The supervision by the Council has hitherto been conducted by the Branch Councils, and has certainly worked very fairly; but if the institution of independent visitors be impossible, we think the efficacy of visitation would be increased were the Branch Council of one division of the kingdom to visit the examinations of another.

22. One of the great evils at the present moment is the inequality of the examinations for the licence. This inequality of the test of efficiency is the more unfortunate, as every licence confers an equality in the right to practise everywhere. The easy examination of one Licensing Body tends to depress the standard of the examination in all the rest. Visitations of examinations doubtless partly remedy this state of things, but to completely remove it a bolder course is necessary. The time has now arrived when, leaving to the Universities and Corporations full liberty to deal as they please with their honorary distinctions and degrees, the Medical Council should endeavour to effect such combinations of the Licensing Bodies included in Schedule (A) as may form a conjoint Examining Board for each division of the kingdom, before which every person who desired a licence to practise should appear, and by which he should be examined on all subjects. Any higher degrees he may wish to take should come after, and should be optional.

This plan is one which the Council has often approached and has recommended in principle.

We feel assured that the examinations for licence will never be made satisfactory without it, and, therefore, that it is for the public good to enforce it without delay. Considering, also, the extent to which the Colleges of Surgeons and Physicians have already combined in England and Scotland, we cannot apprehend any insuperable difficulty in carrying out this object.

23. To enter into the details of such an arrangement of conjoint Examining Boards, would lead us beyond the scope of the inquiry entrusted to us. The notice of the point has, however, naturally

grown out of our subject; and we trust the Council will appoint another Committee to consider and report how the examinations for licence in the three kingdoms can be thus provided for, and then apply, if necessary, for Parliamentary powers to carry the recommendation into effect.

24. We have now to sum up our answer to the resolution of the Council appointing this Committee. We recommend—

1*st*.—That the ten subjects deemed necessary by the Council be further sub-divided, for the purposes of teaching, as follows:—

1. Physics.
2. Chemistry.
3. Medical Chemistry.
4. Anatomy.
5. General Anatomy.
6. Physiology.
7. Pharmacy.
8. Therapeutics.
9. Medicine.
10. Surgery.
11. Pathological Anatomy.
12. Midwifery.
13. Forensic Medicine.
14. Hygiene.

2*nd*.—That Physics, Chemistry, Medical Chemistry, Anatomy, General Anatomy, Physiology and Pharmacy (and Botany if included) be studied previously to passing the first professional examination.

3*rd*.—That in the remaining period of the four years, the other subjects shall be studied, viz., Therapeutics, Medicine, Surgery Pathological Anatomy, Midwifery, Forensic Medicine, and Hygiene, and that the second or pass examination shall then take place.

4*th*.—That the exact order, number of lectures, and amount and kind of practical instruction be left to the schools, a guide being furnished to them by a definition of the area in each subject over which the examination will extend.

5*th*.—That the schools institute class examinations in all these subjects, and that the certificate of study shall attest that the student has undergone these examinations.

25. If the Council approve the policy sketched out in this Report, and decide on carrying it into effect, we suggest that a small Committee, consisting of about five members, shall be appointed,

and shall receive full powers to enter during the recess into communication with the various Licensing Bodies with respect to the limits of examination; and that this Committee shall present to the Council, at its meeting in 1870, a definite plan showing the extent to which the Licensing Bodies propose to carry their examinations. This Committee should also have power to enter into the other matters noted in the Report, especially into the possibility of forming conjoint examining boards, before which every student shall appear, to entitle him to receive a licence to practise. The Council will then be in a position next year to take definite action in the matter.

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RESOLUTION OF THE MEDICAL COUNCIL APPOINTING THE COMMITTEE.—(*Minutes, vol.* vi., *p.* 191.)

"That a Committee be appointed to consider and report how the various subjects of Medical Education which have been deemed requisite by the Council may be taught with most advantage; in what order they should be studied; and how the Examinations on them ought to be arranged."

(*Copy of* PROFESSOR SYME'S *letter, requesting Answers to Questions.*)

"OFFICE OF THE GENERAL COUNCIL OF
"MEDICAL EDUCATION,
"32, SOHO SQUARE, LONDON, W.
"*July*, 1868.

"SIR,

"A Committee of the Medical Council has been appointed to inquire 'how the various subjects of Medical Education which have been deemed requisite by the Council, may be taught with most advantage; in what order they should be studied; and how the Examinations on them ought to be arranged.'

"By the recommendation of the Medical Council, four years are to be devoted to the study of the ten following subjects, namely: 1—Anatomy; 2—General Anatomy; 3—Physiology; 4—Chemistry; 5—Materia Medica; 6—Practical Pharmacy; 7—Medicine; 8—Surgery; 9—Midwifery; 10—Forensic Medicine. There must, therefore, be a limit to the extent and detail in which the several branches can be taught.

"The above inquiry is restricted to the course of study which is necessary to enable students to obtain the requisite knowledge and skill for the efficient practice of their profession, and is not intended to embrace the fuller courses of study suited for the higher qualifications.

"Having regard to the nature of the inquiry and circumstances, as above stated, the Committee would feel obliged by your communicating to them in writing the expression of your opinion on the following points:—

"1. The topics which may most advantageously be included under the subject of

"2. The period in a four years' course when can be most profitably studied, and the length of time which should be devoted to

"3. The manner in which can best be taught—by lectures, practical instruction, or otherwise.

"The Committee would also feel obliged by any further observations or information which may occur to you as deserving of attention in connection with the subject of their inquiry.

"The Committee beg leave to express their hope that the importance of the subject in question will induce you to forgive the trouble thus proposed, and that you will transmit your reply to me at the above address, on or before the 1st of October, 1868.

"I am, SIR,
"Your obedient Servant,
(Signed) "JAMES SYME,
"*Chairman of Committee.*"

CHEMISTRY.

NAMES OF GENTLEMEN WHOSE REPLIES FOLLOW.

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REPLIES.

Dr. THOMAS ANDERSON, *Glasgow.*

In replying to your letter, asking for information on the teaching of Chemistry to Medical Students, I should wish to remark at the outset that the subject is beset with peculiar difficulties, dependent to a great degree on the want of proper preliminary training on the part of the student. In the other learned professions the student only enters on his studies after a long course of preliminary training, calculated to prepare his mind for the reception of the particular kind of knowledge he requires. The medical student has not this advantage. He generally comes direct from school to his professional studies, and is compelled to acquire at one and the same time his knowledge of the practical details and the mental training which enables him to understand its principles. Kind friends, too, frequently give him the advice above all things to get "practical" knowledge, an advice which would be perfectly right if it were not that by the term practical they too often mean empirical knowledge. The result is that the student comes to his studies prepared to neglect or undervalue those subjects in which general principles are taught, the more especially as they present the greatest difficulty to his untrained mind, and in the case of Chemistry this tendency is further increased by his inability, in the early part of his studies, to see its practical bearings on the more purely professional branches of his education. Whatever be the exact causes of it there can be no doubt that the chemical knowledge of most medical students is extremely limited, and that when medical and non-medical students are taught together the latter are generally found to be much better acquainted with the subject than the former. It is not easy to find a cure for this, but I think a material improvement would be effected if Chemistry, along with Botany and Natural History, could be made matters of purely preliminary study, and a year be divided to them before the commencement of the more strictly professional subjects. The mind of the student would thus be more thoroughly concentrated upon them, in place of being distracted by the attempt to learn the more practical subjects at the same time, which is carried so far that I have known students in their first year attending Chemistry, Anatomy, and Clinical lectures, and even making the latter an excuse for irregular attendance at the two former.

As far as the particular departments of Chemistry to be taught to medical students are concerned, I am of opinion that more attention should be paid to the general principles than has been customary, at least of late years. In the hands of some teachers Chemistry has become a mere mass of details, and is occupied almost entirely with an account of the properties of a vast number of chemical compounds. That a course of lectures on Chemistry must always contain much detail is obvious, but it is equally clear, that it is unadvisable to overload the memory of the student, which leads to the practice of cramming. For this reason I am inclined to devote but a small part of an ordinary course of Chemistry to the organic part of the science, and to confine attention to its principles and classification, with such a sketch of some of its more important compounds as will serve to illustrate these. I should omit all details regarding the crystalline substances found in drugs, and hand that over to Materia Medica; the details of the properties of these substances are most uninteresting to the student, when taken alone, but they are quite the reverse when considered in connection with the physiological and therapeutic actions. A similar observation applies to Animal Chemistry, the interest of which lies so entirely in its physiological and pathological relations that it cannot be advantageously studied until the student has learned these subjects.

Should Chemistry be made a branch of preliminary study, it would be necessary to introduce, towards the close of the curriculum, a course of lectures on Medical Chemistry, in which these subjects may be treated more fully than is at present practicable. Indeed, such a course must under any circumstances soon be instituted, for the neglect of these departments, which at present prevails in this country, cannot be allowed to continue much longer, and some means must soon be adopted to familiarize the medical student with what is now becoming so important a subject.

The course of lectures on Practical Chemistry at present given to medical students, is probably, when well taught, as efficient as it is possible to make it under present circumstances. Its chief defect lies in the small amount of time devoted to it, which makes it impossible for the student to acquire the necessary amount of experience. In testing their power of detecting unknown substances, I have always found that where students fail, their errors are due much less to ignorance than to their inability to meet the little peculiarities of individual cases, which of course can only be overcome by practice and experience. The course is much liked by students, who attend it with great regularity and take much interest in the work, and I do not think that any alteration for the better could be made in it, unless it were to make every student attend a chemical laboratory, which in the present state of medical education would be nearly, if not altogether, impracticable.

What is true of Chemistry is more or less applicable to all the other departments of medical study, and it is necessary to pay more attention to

general principles and less to details, so as to counteract what seems to me to be the growing tendency on the part of the student, to learn by memory and not by understanding. Into this matter, however, I think it unnecessary to enter, as I have no doubt it will be fully considered by the Committee.

Dr. THOMAS ANDREWS, *Belfast.*

In reply to your letter of the 4th of August, I beg to transmit, for the information of the Committee of the Medical Council, the following brief statement of my views on the subjects referred to in that letter.

1. The course of Chemistry should embrace attendance on a systematic set of lectures, and also working for a specified time in a chemical laboratory. In addition to inorganic and organic chemistry, I am of opinion that it is desirable for the lecturer to give a short *résumé* of the subjects usually treated under the name of Clinical Physics. In the practical or laboratory class, the student should go through a regular course of quantitative analysis, and be encouraged to proceed further if he have leisure or a desire for improvement.

2. In a four years' course, the student ought to attend lectures on Chemistry in the first year, and a chemical laboratory in the second year. Three months of practical work will suffice, and these may be with advantage in summer.

3. I am clearly of opinion that Chemistry can only be usefully taught by the combination of attendance on lectures and laboratory work. Without some practical work, the former will be of little service. Every medical man should be able to make a general examination of the urine, and to test the common impurities in drugs. As an introduction to the study of Forensic Medicine, a certain amount of knowledge of Practical Chemistry is all but essential.

Dr. JOHN ATTFIELD, *London.*

Before attempting to answer your questions, as to (1) "the topics which may most advantageously be included under the subjects of Chemistry, Materia Medica, Practical Pharmacy, and Therapeutics; (2) the period in a four years' course when they can be most profitably studied, and the length of time which should be devoted to them; and (3) the manner in which they can best be taught—by lectures, practical instruction or otherwise"—before replying to these inquiries, let me give you the grounds on which I venture to comply with your request for my opinion. I state these grounds in order that you may see that my advice is founded not only on tutorial experience but on an unusually extended experience as a student.

Medical students seldom give more than one year to Materia Medica, Practical Pharmacy, and Chemistry; to these subjects I devoted six years. Moreover, as the following paragraph will show you, my course of study was essentially practical. I mention all this (risking the charge of egotism) because I feel that unless the quality of evidence be known, accident may accord it higher or lower value, each of which extremes I desire equally to avoid.

My acquirement, then, as a student, of a knowledge of three out of the four subjects mentioned in your letter of August 4th, 1868, was unusually thorough. From 1849 to 1852 my attention was entirely concentrated on Practical Pharmacy, that is, dispensing prescriptions and manufacturing nearly every Galenical (as distinguished from chemical) preparation of the *Pharmacopœia* (P. L.); in 1853 I studied Materia Medica; and in 1854, after vainly endeavouring to learn Chemistry from lectures, worked at Practical Chemistry, daily, for six hours in the laboratories of the Pharmaceutical Society, manufacturing nearly all the chemical preparations of the *Pharmacopœia*, and going through an extended course of chemical analysis including chemical toxicology and the chemistry of the urine. During the succeeding eight years, as Demonstrator of Practical Chemistry at Saint Bartholomew's Hospital, I taught Chemistry to all students of the summer sessions and conducted oral examinations in the winter sessions. From 1862 to the present date (Oct. 1868), as Professor of Practical Chemistry to the Pharmaceutical Society, I have directed the studies of pupils, who work for six hours daily at benches in the laboratories, for periods varying from three to ten months. I claim to possess, therefore, much experience in learning and teaching Chemistry, and a considerable knowledge of Practical Pharmacy. I have but little experience in teaching that part of Materia Medica which is not chemical, and I know nothing of Therapeutics.

In answer to your inquiries regarding Materia Medica, I cannot presume to say what topics may most advantageously be included under the subject, nor the period of a four years' course, when it can best be studied; but a a result of three years' experience in teaching a small private class, I may state that, in my opinion, the only satisfactory method of imparting instruction in Materia Medica is by demonstration from specimens, and that the only certain way of ascertaining that one's students are making substantial progress is by orally examining each from specimens, the pupil being allowed to handle a sample of a drug while being asked by the tutor (*a*) its common name, (*b*) botanical name, (*c*) natural order, (*d*) habitat, (*e*) part of plant, (*f*) active principle, (*g*) pharmacopœial preparations, (*h*) doses of ditto, (*i*) (*j*) (*k*), etc.

Concerning Practical Pharmacy, that is, the preparation of official Galenical substances and compounding prescriptions, I think instruction might be afforded to medical students through the machinery of the dispensing

departments of the various hospitals to which medical schools are attached. A demonstrator might be appointed to direct and overlook six to twelve students, each working for two or three hours daily during about two months ; operations to consist in making small quantities of confections, decoctions, enemas, extracts, glycerines, infusions, inhalations, juices, liniments, mixtures, ointments, pills, plasters, poultices, powders, spirits, suppositories, syrups, tinctures, waters, wines, and in compounding the prescriptions of the medical officers of the hospital, for the out and in-patients. Whether Practical Pharmacy should be studied in the first or second year would not much matter. If sets of six to twelve students worked daily for two or three hours during one or two months, or once weekly for a session, all could be taught by one demonstrator, at times convenient to the students themselves.

Chemistry should certainly include its applications to Pharmacy, Toxicology, Therapeutics, and Hygiene. Mechanics, Heat, Light, Electricity, and Magnetism, would best be taught by a special professor.

I am strongly of opinion that medical students should learn Chemistry chiefly by means of Practical Chemistry, first performing synthetical and analytical operations at a bench in a laboratory, and afterwards attending a course of lectures—that is, reversing the usual order in which these subjects are studied at medical schools. My reasons for this opinion are, that (*a*) of the 500 medical students whom I have instructed in Practical Chemistry, all having previously attended a six months' course of lectures on Chemistry, not 100 on entering the laboratory knew or pretended to know the leading principles of the science, and (*b*) three-fifths could not even draw out a diagram or equation descriptive of a common chemical reaction. On the other hand, of the 200 or 250 pharmaceutical students who have, under me, worked at Practical Chemistry for three months (Oct., Nov., and Dec.) of a session and then attended lectures on leading chemical doctrines, there have not been 10 who could not pass a fair examination in the main principles of the science or give a correct description of most chemical processes. In my opinion a five or six months' winter course of Practical Chemistry, consisting of daily lessons of two or three hours each, succeeded by a three months' course of one-hour lectures, given daily, should form the chemical curriculum of a medical student. Such a course of practical instruction might be carried out somewhat in the following manner—a plan I have already found to work well in practice :—

1. A few experiments with non-metallic elements, that is, preparation of oxygen, hydrogen, nitrogen, and chlorine, and simple operations with phosphorus, sulphur, carbon, and iodine (quite on the small scale—by aid of a few test-tubes, a test-glass, and glass-tubing). This would afford an opportunity for giving a student fundamental notions of Chemistry, and for instructing him in the use of symbols and formula.

2. Experiments illustrating the Chemistry of each of the common metals from two points of view, (*a*) synthetical, (*b*) analytical. These operations being performed in test-tubes and small dishes, the student *in a short space of time* would thus learn how to prepare nearly every chemical compound in the *Pharmacopœia*, and the means by which each element is analytically recognized.
3. Similar experiments with acids, and a few special chemical operations on substances of vegetable and animal origin, would complete the student's knowledge of pharmacopœial and all ordinary salts, enable him to detect impurities, adulterations, and faults of manufacture in any article of the Materia Medica, make him a facile manipulator, and, if supplemented by good tutorial direction, well ground him in chemical principles.
4. Chemico-toxicological operations would follow, and examination of morbid urine and calculi.

The cost of necessary apparatus and chemicals for such a course would be small ; a guide-book already exists.

Supervision of the students by the professor or demonstrator being constant, formal examination of the whole class would seldom be necessary.

A succeeding course of lectures would consolidate and extend knowledge thus practically acquired.

With regard to your request for any further observations which may occur to me as deserving of attention in connection with the subject of your inquiry, I would beg leave to mention four :—

First.—I would suggest that while students should attend the Practical Class and Chemical Lectures during their first year of studentship, they should be invited, indeed requested, to bring specimens of urine, urinary sediments, &c., from the hospital wards to the laboratory for examination at any time during their second, third, or fourth year.

Second.—One or more good but inexpensive microscopes should be kept in or near the Laboratory, under the care of the demonstrator, for use by any student at any time.

Third.—The study of Chemistry by medical pupils would be much facilitated if the nomenclature of certain portions of the *British Pharmacopœia* were assimilated to that of the leading chemical text-books now published. The official names of the salts of the common metals are unexceptionable—teachers cannot do better than continue to speak of the compounds of iron, zinc, cadmium, arsenic, copper, antimony, mercury, lead, silver, and bismuth by existing pharmacopœial names ; but to speak of the compounds of the alkali and earthy metals both as those of potassium and potash, sodium and soda, ammonium and ammonia, calcium and lime, and magnesium as well as magnesia, is altogether unnecessary, and indeed mischievous—clogging the steps of the medical student and the wheels of Chemistry itself. Most,

if not all, teachers now adopt the simple and, as far as we know, correct plan of regarding all such salts as compounds of metals;—thus sulphate of iron, sulphate of sodium, nitrate of silver, nitrate of potassium, carbonate of lead, &c., and leave the names potash, soda, ammonia, lime, magnesia, to the well-known bodies to which they belong (as in liq. potassæ, ammoniæ, calcis, &c.) We already have potassii iodidum, why not potassi nitras (not potassæ nitras); sodii chloridum, why not sodii sulphas (not sodæ sulphas); ammonii bromidum, why not ammonii carbonas (not ammonæ carbonas). Not only are these old names incorrect, but inconvenient for educational purposes. I used to find that students did not know which were salts of potassium and which of potash, which sodium and which soda, until two or three months' usage had made the names familiar. Now my students are once for all told that all salts are compounds of their metals alone, and not only is all difficulty removed, but no difficulty arises. Such an easy and natural system of names would not necessarily cause confusion to gentlemen in practice or men in business, for prescribers might still write potas. nit., magn. sulph., ammon. carb., &c.; while our grand national *Pharmacopœia* would preserve its credit of keeping pace with and reflecting modern science. I would venture to ask whether or not the Education Committee of the Medical Council might call the attention of the Pharmacopœia Committee to this subject?

Fourth.—I would beg to record my opinion that no official examination of medical students conducted with the view of gauging their chemical knowledge can be considered satisfactory which does not include a request to the candidate to test a solution, a specimen of diabetic urine, &c., before the eyes of the examiner. (Example of questions:—"Here is a bottle labelled 'Corrosive Sublimate Solution;' select one of the test liquids before you, and demonstrate the correctness of the label." "Here is 'Diabetic Urine;' test it.") From experience I can say that such an examination can be conducted with perfect convenience at the chemistry examiner's table; it may, indeed, be considered to be part of the ordinary examination at that table, and need not occupy more than two or at most three minutes.

Dr. WILLIAM BARKER, *Dublin.*

Having been honoured by a request from the Committee of the Medical Council to give my opinion as to the most efficient mode in which *Chemistry* can be studied by Medical Students, I beg to submit the following observations:—

1. I think the period of time devoted to this subject is usually too short. Few students can acquire any competent knowledge of this science, even limiting it to Medical Chemistry, from a course of lectures of six months'

duration ; and I am therefore of opinion that *at least* nine months should be devoted to this study, which might be sufficient for very diligent students.

2. A portion of the course should be devoted to manipulations and operations. By these means only can students acquire that knowledge of conducting processes and analyses so important to the medical practitioner.

3. There should be a curriculum stating the order in which lectures, &c., should be attended. Many students commence their studies with advanced subjects, omitting till a later period those which are truly elementary. In my opinion Anatomy and Chemistry should alone form the first, or better still, the first and second years' study; Physiology, Practice, Hospital, &c., the subsequent years, as the teachers of these subjects must assume that students are acquainted with Anatomy and Chemistry.

4. Whatever curriculum is laid down I think it should extend over four years as a minimum; and the best mode of effecting this would be the definition of the subjects to be studied in each year.

Dr. CHARLES L. BLOXAM, *London.*

With reference to the three points on which the Committee of the Medical Council do me the honour of inviting an expression of my opinion, I beg leave to submit the following recommendations :

1. "The topics which may most advantageously be included under the subject of Chemistry," are—

(*a.*) The preparation, composition, and properties of the principal elementary forms of matter, and of such of their inorganic and organic compounds as have any connection with Medicine.

(*b.*) The great general laws of chemical action, to the exclusion of ephemeral theories propounded by rival contemporaries, and of interest only to the professional chemist.

(*c.*) Chemical operations taking place in the animal body.

In the study of these subjects the time and attention of the students should not be occupied with the subtleties of symbolic notation, but with such matters as are commonly remembered, and found to be useful by medical men who have been in practice for some years.

(*d.*) The identification, by chemical analysis, of the inorganic and organic substances connected with Medicine.

2. "The periods in a four years' course when these subjects can be most profitably studied, and the length of time which should be devoted to them," appear to me to be the following :

First Winter Session.—Forty lectures (two in each week) on the Inorganic Elements and Compounds, and on the Laws of Chemical Action.

First Summer Session.—Thirty-six laboratory lessons (three in each week) of two hours, on the Identification of the Inorganic Substances connected with Medicine.

Second Winter Session.—Forty lectures on the Organic Compounds connected with Medicine.

Second Summer Session.—Thirty-six laboratory lessons of two hours, on the Identification of the Organic Substances connected with Medicine.

Third Winter Session.—Twenty lectures (one in each week) on the Chemical Operations taking place in the Animal Body.

Third Summer Session.—Twelve laboratory lessons (one in each week) of two hours, on the Detection of Poisons.

3. "The manner in which Chemistry can best be taught."

The lectures should not be read from a book or manuscript, but should be actual discourses of a demonstrative and practical character, with as many illustrations as possible. The student should be required to keep notes, and occasional *vivâ voce* examinations should be held, at which the student should have the assistance of his note-book.

A written examination should be held at the end of each course. In the laboratory classes, each student should work for himself; analyzing substances of which the composition is known only to the teacher, and should be required to keep notes which demonstrate, in a logical manner, each step of his analytical operations.

Dr. J. BLYTH, *Cork.*

In reply to your circular of the 4th of August, I beg to state as my decided opinion, that a course of Theoretical Chemistry should precede practical instruction in the laboratory; that the proper period for attendance on the theoretical course by medical students is the first year of their studies; that such a course is in itself of little value, unless followed immediately by a practical course of at least three months' duration; that the proposed mode of teaching a theoretical course is by lectures, thoroughly illustrated by experiments; and that the practical course should be conducted in the laboratory, in which each student should be made to go through a systematic course of qualitative chemical analysis.

It was an established rule with Baron Liebig never to give *special* courses to the different members of his class who were afterwards to direct their attention to medicine, brewing, metallurgy, dying, &c. He taught that as the *principles* of the science are the same under all circumstances, the great object of the learner should be to master these, and the applications to medicine, brewing, metallurgy, &c., would come easily afterwards.

No better rule than this can be followed in teaching Chemistry to medical students, who have only a limited time for its study, whose memories should not therefore be encumbered with the applications of the science to the arts, nor with too great an accumulation of isolated facts. The teacher should dwell upon the history of the elements and their principal compounds only so far as to make the student fairly acquainted with them, and to deduce from them general laws. In this first part of the course he ought to get a tolerable knowledge of the principles of Chemical Philosophy and of Inorganic bodies.

Organic Chemistry is of such vast extent that a selection of topics becomes here of the utmost importance. A sufficient elementary knowledge of this branch would be obtained by confining the attention of the student to the alternate analysis of Organic bodies and the determination of their formulæ, followed by a discussion, of some of the most important theories of Organic Chemistry. In illustration of these theories some of the substances most important to medical men, might be selected; such as cyanogen and its derivatives, amylaceous and saccharine matters, a short account of the different alcohols and their derivations, organic bodies, and the chief constituents of vegetable and animal organisms.

It is highly desirable that the progress of the student should be tested from time to time during the course, by examinations by the teacher, and by a more stringent one to be held at its termination.

Such a course, if properly taught, and duly attended, will give the student a fair knowledge of the science, provided a proper check on his attention and diligence be kept through means of periodical examinations by the teacher. Such knowledge will, however, soon pass from his memory, unless it be impressed upon it by a succeeding course of practical Chemistry.

In the practical course, I regard the preparation of gases, and of mere Chemical compounds, as a serious waste of time. The chief object should be, in my opinion, to give a short course of qualitative Chemical analysis. By working from a test book under the eye of the teacher, the student learns the properties of the metallic oxides, and of the acids, and in his experiments he now puts into practice the general principles he had acquired in the theoretical course. The detection and the separation of two or more bases and acids follow. Such a short course of qualitative analysis will be of real use afterwards in the detection of adulterations in pharmaceutical preparations, in food or drink, and in testing common or mineral waters.

The last part of the course should be devoted to the examination of the constituents of urine in health and disease, and of urinary calculi, and to the detection of some of the most important inorganic and organic poisons.

Such a course I have been in the habit of giving to my students since the foundation of the Queen's Colleges. I find that they attend with the greatest interest and diligence, and derive much benefit from it. A compulsory examination should be held at the end of the course.

In addition to this elementary course of Practical Chemistry, I think an additional and more extended one should be attended by those who desire to pass with honours for their diplomas.

Such a course might embrace a fuller toxicological series of experiments, and a more extended investigation of the solids and fluids of the body in health and disease.

From what I have stated, it will be seen that I regard Chemistry as a most essential branch of medical education.

Physiological and Pathological Chemistry are only yet in their infancy. Judging from what has been already done, it may confidently be asserted that the future progress of Physiology and Pathology will be mainly due to Chemistry. This science will stand in the same relation to Practical Medicine that Anatomy does to Surgery. I cannot, therefore, agree with those who would place Chemistry in the same category with "classics, mathematics, and botany," to be relegated to the period of preliminary medical education. On the other hand, we cannot force all students to acquire the same high standard of attainment in the science. The minds of individual students will always have as great a bias as at present to different branches of their studies. Some will seek to pass their final examinations with the highest honours ; others will be contented to do so at the smallest cost of mental labour. It is for the examining boards to fix such a standard of attainment as shall not permit the latter class to be turned loose upon the public without possessing at least the minimum amount of information deemed necessary for the practice of their profession.

It appears to me that this might be effected, and an end put to the system of mere cramming by grinders, through the establishment of a more *practical* system of examinations for diplomas than at present exists, and of a more uniform standard of attainments by the different boards. Reform in this direction is more practicable than in enforcing on teachers the adoption of a uniform method of instruction. The precise mode in which each should impart knowledge cannot be laid down by absolute rules. Some prefer the inductive, others the deductive, method of teaching ; and each by following the natural bent of his own mind will be more likely to prove an efficient teacher than if trammelled by rigid rules.

It has been strongly recommended that the student should not attend a course of lectures, but begin at once by performing experiments in the

laboratory, and only a few lectures should, after some time, be given to explain his experiments and deduce general laws from them.

No doubt if a teacher devote his whole time to grinding a few pupils in a laboratory, he will by a continuous course of experiments make such pupils greater adepts in Chemistry than those who acquire their information from lectures; but there is no more necessity to pursue this method to obtain a knowledge of the rudiments of Chemistry than of Natural Philosophy. Any one acquainted with the ordinary working of a laboratory, with the great labour incident to the fitting up of apparatus for the purposes of experiments, will pronounce as hopeless, any scheme for educating a class of a hundred students by taking them in sections into a laboratory for experiments, without any previous theoretical knowledge. Such a plan would entail so much expense in apparatus and materials, so great a loss of time in mere preparations, so much labour to the teacher, even when aided by a large staff of assistants, and such entire devotion of his whole attention to the mere practice of grinding, to the exclusion of every other occupation, that few indeed would voluntarily choose the very hard lot of a teacher of Chemistry.

Were such courses even practicable, I fear they would degenerate into classes for amusement and for the explosion of gases, as was much the case with the so-called classes of Practical Chemistry for medical students of a former age.

Dr. JAMES S. BRAZIER, *Aberdeen.*

In answer to your communication of the 4th of August, relative to the inquiry "how the various subjects of medical education which have been deemed requisite by the Council, may be taught with most advantage," I beg humbly to express my opinion in respect to Chemistry as follows:—

1. "The manner in which it can best be taught—by lectures, practical instruction, or otherwise.

To impart a knowledge of Chemistry to the greatest advantage, without doubt, it must be given by well illustrated lectures, and by practical instruction in the laboratory.

2. "The period in a four years' course when it can be most profitably studied, and the length of time which should be devoted to it."

In this University the first Winter Session is usually devoted to the course of Theoretical Chemistry, and the following summer to that of Practical Chemistry. I see no advantage to be gained by deviating from this arrangement; on the contrary, on account of the many applications of Chemistry in the various departments of Medical Science, the earlier it is taken by the student the better.

A six months' course of lectures on Theoretical Chemistry, together with a three months' course of Practical Chemistry, is that usually prescribed. After attendance on two such courses, many students have acquired that amount of knowledge which seems at the present time to be required by the various Examining Boards. I may mention, however, that very many students under my own instruction repeat, optionally, their attendance on the theoretical course during a second Winter Session, and I think with very great advantage to themselves.

3. "The topics which may most advantageously be included under the subject of Chemistry."

Under this head, I would simply remark that, in describing the history of the various elements, due care should be taken to select such as are best adapted for illustrating the laws of the science, and have at the same time a special claim upon the attention of the medical student.

Sir BENJAMIN C. BRODIE, Bart., *Oxford.*

There is one point which I especially wish to press on the attention of the Committee of the Medical Council, in reference to their question as to how the various subjects of Medical Education may be taught with the greatest advantage, namely, the expediency of effecting a separation, as complete as possible, between preliminary scientific study and the special studies of the profession, and of devoting a larger portion of time and attention than now to the former.

As the matter stands, the student, often without any scientific training whatever, enters at once, in the school of the hospital, not only on his professional studies, but also on the study of Chemistry and Physiology, so that his energies are distracted by a variety of new pursuits simultaneously pressed upon him.

To gain acquaintance with the principles of even one science is no easy task, and demands the concentrated and almost undivided attention of the student. Time also is necessarily required to secure a practical familiarity with such a subject as Chemistry. Knowledge which is hastily gained is liable to vanish from the mind as speedily. From my experience, I should say that a year at least should be passed in a laboratory, and devoted almost exclusively to this subject, and that no real and valuable acquaintance with it can be acquired in less time.

Another evil of the present system is the very limited course of scientific instruction which a private medical school affords. Chemistry is not a

subject existing apart from other branches of knowledge, and to be taught by itself. It is most advantageously pursued when its study is associated with the study of the cognate sciences, and forms part of a more extended scientific course. So that an adequate system of scientific instruction can only be carried on by several professors, and requires numerous and expensive arrangements. Now a medical school is not a school of general science, and it is only where a hospital is associated with such a school that even the possibility of scientific instruction is afforded.

The conclusion is, that the scientific part of medical education should be pursued at a distinct time and in a separate place. Less in this direction should be attempted in the medical school, and more should be effected in the earlier period of life.

Before the student even commenced his medical studies, I would exact a guarantee that he had efficiently and really studied the preliminary sciences of Chemistry, Physiology, and general Physics, and that these sciences had formed an essential and integral part of his education. For this, a special examination might be instituted, and certificates of study required. This examination would somewhat correspond to the first medical examination at Oxford, only I would put that examination earlier. I would not send the student away from the university or college to the hospital, and bring him back, after two years, to undergo this examination, which is often a serious hardship, but he should be examined before he commenced his medical career at all. This examination should be of a serious kind, and of such as would represent, in the case of the ordinary student, at least two years of work. After two years' devotion to these subjects, the student would gain an acquaintance with them which he could always recover, and indeed would never altogether lose. After this he would be free to give himself exclusively to Medicine, in which he might be expected to make far more rapid progress than now, for he would have acquired scientific habits of mind, and that power of learning from actual experience, which the ordinary literary education fails altogether to impart, but which is absolutely essential to the effective study of his profession. In this respect there would be a real economy of time.

However, it may still be urged that the available period of medical education is not sufficient for such a course; and this, undoubtedly, would be true, if you still mean to exact from the medical student that irregular mass of acquirements which is so falsely called "General Education," but which is too often only the nominal substitute for any education at all. If he is to be examined in ancient and modern languages, in Latin, Greek, logic, history, and natural philosophy, time will certainly seem short. But it appears to me, I confess, that in exacting this evidence of general attainment, the Medical Council is travelling a little out of its sphere. We should demand and exact from the student only what is most important, and

interpose no unnecessary barriers in the experimental sciences; both, in their facts and in their methods, have an importance to the medical student which the study of language and general literature does not possess, and it is only putting a seasonable pressure upon him to require that he should devote a certain portion of his early education to their study. But with literary acquirement the case is quite different, and I myself should be content, provided such a scientific examination were sufficiently comprehensive to exact nothing else from him at the entrance of his profession, and to leave the rest to the general tendencies and requirements of society.

Such a system must be gradually introduced, and it might at first be optional with the student, whether he would pass the preliminary scientific examination at the commencement of his medical course, or at a later period. But the deficiencies in the unsound scientific education which at present exist would, under its influence, be soon supplied. Schools and colleges would come forward to meet the demand, and before long we should have a regular course of education for boys, from the age of sixteen, destined for the medical profession, precisely as we have now for the engineers in the army. The system of the universities would speedily be adapted to it, and the medical student, who has too long been exiled from them, would again find his place there.

The true function of the medical man is that of adviser and referee in all sanitary questions; and in the suggestions which I have here ventured to make, I certainly have considered that that course of training which would best fit him for such a function, is that which "fits him for the efficient study of his profession." Numerous problems fall under his consideration, which cannot be dealt with by "prescriptions," and it would be an incalculable benefit to the nation if we could really secure throughout the country a body of practitioners who would bring to bear upon sanitary questions, not only the technical experience of their profession, but the available resources of science.

Dr. ALEX. CRUM BROWN, *Edinburgh.*

In answer to the questions contained in your circular, I beg to state—

1. That, as a student is not required to possess any knowledge of natural philosophy (beyond the elements of mechanics) before commencing his professional studies, it is impossible to exclude physics from a course of Chemistry intended for medical students. Physics should, however, in my opinion, be treated as an entirely subsidiary part of the course, and such subjects as the general properties of matter—elasticity, heat, electricity, &c.,

should be referred to and explained, only so far as may be necessary, in order to render the chemical teaching intelligible.

As Chemistry proper is too extensive a science to be satisfactorily treated in a single course of lectures, I would suggest that the greater part of the course should be devoted to the explanation of the general principles of the science and the illustration of these by means of suitable examples, and that during the remainder of the course the compounds derived from some one element, or belonging to some one series, should be treated in detail, thus giving a specimen of the way in which the general sketch might be filled up, did time permit. It appears to me altogether unnecessary for a chemical teacher to attempt to cover the ground, which must again be gone over under much more favourable circumstances by the teachers of Physiology, Materia Medica, Pharmacy and Forensic Medicine. It is his duty not to *teach* these subjects, but to *prepare* the student for the intelligent study of them.

2. That Chemistry should have as early a place as possible in the curriculum. I think the present plan of placing Chemistry in the first Winter Session, and Practical Chemistry in the succeeding Summer Session is as good an arrangement as can be suggested. I do not think that Chemistry can be properly taught in a shorter time than that at present devoted to it, viz. : a six months' course of one hundred lectures, and a three months' course of Practical Chemistry.

3. That the best way to teach the principles of Chemistry is by lectures (illustrated by diagrams and experiments), combined with frequent oral examination. With reference to practical chemical instruction I think that (considering the very short time at our disposal) it is more important that the medical student should be taught how to use ordinary chemical apparatus, including the balance, than that he should be conducted through an imperfect course of qualitative analysis.*

If the suggestions I have ventured to make in reference to the manner of teaching Chemistry and Practical Chemistry were adopted, it would of course be necessary to modify to some extent the examinations on these subjects, and require from each candidate a knowledge of general principles, allowing him to select that part of the subject on which he professes himself prepared to be examined in detail, and to make the practical chemical examination a test of *skill*, rather than, what it now generally is, a test of *knowledge*.

* It is my decided opinion that practical chemical classes, as at present conducted, are of very little use. The greater part of the time is necessarily devoted to preparation for examination, and the knowledge thus acquired is (to a great extent) of a kind which it is difficult for the student to apply to any case likely to arise in practice.

Dr. WILLIAM CROOKES, *London.*

The points to which you more particularly direct attention are as follows:

1. "The topics which may most advantageously be included under the subject of Chemistry."
2. "The period in a four years' course when it can be most profitably studied, and the length of time which should be devoted to it."
3. "The manner in which it can best be taught—by lectures, practical instruction, or otherwise."

The topics which it would appear most desirable to include under the subject of Chemistry may be classified as relating to Inorganic, Organic, Pharmaceutical, Toxicological, Physiological, and Pathological Chemistry, respectively. The period at which each section should be taught depends entirely upon its connection with other studies. Inorganic Chemistry is necessary for the study of each of the other sections, and it may be observed that each successive section requires for its proper study a knowledge of the preceding sections.

During the *First Winter Term*, Inorganic and Organic Chemistry would appear the most suitable to be taught, the basis of the teaching being *qualitative* analysis.

The *First Summer Course* might include volumetric and quantitative analysis in illustration of the subjects connected with Forensic Medicine and Materia Medica, such as quinine, morphia, prussic acid, &c. Analitative analysis, as applicable to general anatomy, should be taught at the time of studying the latter subject (*First Winter* or *First Summer*).

Second Winter Course.—Sufficient Practical Chemistry might be taught for the full understanding of the higher physiological teaching, such as the nature and composition of bile, fat, urine, blood, fibrin, gelatine, &c.; and the chemical action of the healthy secretions. The methods here would be mainly those of qualitative analysis.

Second Summer Course.—Pathological and Hygienic Chemistry, as a preparation for the study of Surgery and Medicine, should be taught *quantitatively;* such subjects are here included as the elements of gas-analysis, water-analysis, analysis of milk, tests for food adulteration, quantitative estimation of the constituents of urine, &c.

By devoting two years to good practical work, not only are the contemporaneous subjects illustrated, but the after subjects are thoroughly prepared for (Surgery, Medicine).

It is somewhat difficult to say how much a knowledge of purely theoretical Chemistry should be required. Considering the limited time in which Chemistry is to be learnt, and remembering that the value of the science to medical students depends upon their perfect familiarity with the physical

phenomena as observed in the laboratory, I certainly recommend that no more theory be taught than is necessary to enable the memory to be properly stored with the requisite facts. Chemistry is required as a practical means of research, and the various theoretical questions which are now agitating the chemical world refer to topics which are far removed from the ordinary requirements of medical students.

For this reason, I would also considerably curtail, if not altogether abolish, lectures on Chemistry. Such a knowledge of Chemistry as a medical student requires can only be gained by actual manipulation with the test tube and filter; and no amount of lectures, however copiously illustrated, can give that manipulative dexterity which is essential to the successful performance of the simplest analytical operation. The only value of lectures consists in the demonstration of experiments, and in affording a supplement to the text book of the class. As, however, a large scale of operations is absolutely necessary for a very limited number of experiments, lectures might very safely be abolished, or, at the most, attendance upon them should be optional.

The foregoing recommendations are founded upon the principle, that after the elementary knowledge essential to every educated man, a sort of technological application of it should be made to medical science, &c. The writer would venture to suggest to your Committee that the Pharmaceutical Society gives ample facilities for the practice of this method, and the majority of the students there are in the habit of daily using delicate chemical balances, &c., and other apparatus which it is quite safe to assert that not one medical student in twenty has had the opportunity of using. It hardly seems desirable that the dispensers of medicine should have a better knowledge of *Chemistry* (I do not mean *Pharmacy*) than the prescriber. It may be of practical value to remark that a regular course of water analysis is practised by these students, and that medical students (to the writer's knowledge) have attended such courses, in default of a sufficiently convenient one at their own schools of study.

The fact of the omission of all mention of the study of Physics in the list of necessary branches of medical study is accounted for by the writer in one of two ways. First, that the student has already obtained such knowledge in the course of his general education; or second, a sufficient knowledge on such subjects is to be afforded by the teachers of Chemistry and Physiology respectively. The second of these assumptions excludes any teaching of mechanical philosophy, of the greatest importance to the surgeon-accoucheur and anatomist; the mechanical laws so applicable, are, I believe, never enunciated by the lecturers mentioned, and the subject is not included in the majority of the preliminary examination schemes. Up to the present time, chemical and physiological lecturers have been compelled to give a hasty outline of natural philosophy proper, and this has been the case in spite of the additional matter that has been added year by year, so that the burden

must shortly become unbearable. It seems absurd to lecture to an audience upon the most complex subjects in physiology, *e.g.*, the electricity of nerve and muscle, adjustment of the lens, and formation of erect and inverted images, when these latest scientific results have to be prefaced by an enunciation of elementary laws; a separate course of teaching in these subjects by a competent lecturer, with all necessary appliances and apparatus seems to be most desirable. A medical witness in a court of law is looked upon as *the* scientific witness, and his opinion might be asked of evidence derived from the spectroscope or polariscope,—instruments in continual use by the medical jurist, well trained and educated.

In conclusion, it may be stated that the whole basis of the foregoing remarks rests upon the following proposition. Medicine (including Surgery, &c.) is one branch of *physical research;* those, therefore, who would profess a knowledge of it should be intimately acquainted with the methods, chemical and physical, that are necessary for the successful study of all forms of matter. The laws of matter should be fully recognized to be the laws of *all* matter.

Dr. FRANKLAND, *London.*

In reply to your communication, dated August 4th, 1868, requesting, on behalf of a Committee of the Medical Council, my opinion on certain points connected with the teaching of Chemistry, I beg to say, in reference to the topics which may most advantageously be included under the subject of Chemistry, that, inasmuch as Physics does not appear in the list of subjects, I presume it is not intended to form part of the chemical course. From its great importance, however, to the medical practitioner, it is to be regretted that Physics should not be made the subject of a special course of instruction. Under Chemistry, I should therefore include—

1. Physics.
2. Mineral Chemistry.
3. Organic Chemistry.
4. Qualitative Analysis.

For a complete course of instruction in Chemistry, but not embracing the fuller course of study suited for higher qualifications, one year is the minimum of time required to be *exclusively* devoted to the subject. My experience with students at this College and elsewhere, enables me to state that at the expiration of the time just mentioned, or rather after nine months of actual work, a student of good average ability will pass a satisfactory examination in Physics, Theoretical Chemistry, and Practical Chemistry, including both Qualitative and Quantitative Analysis. Taking

into consideration, however, the number of subjects which have to be studied in the four years' course, I presume that it would be impracticable to devote one year exclusively to Chemistry. In any case, however, I would advise that Chemistry should be taken during the first year, and further, that it should include a course of four or five lectures per week, extending over the whole Winter Session, and a course of laboratory instruction daily, except Saturdays, from 10 A.M. to 5 P.M., throughout the Summer Session.

With regard to the manner in which Chemistry can best be taught, I think that both instruction by lectures and by practical manipulation in a laboratory are essentially necessary. I am also very strongly of opinion that the proficiency of the student ought to be tested at the close of the lecture course by a searching written examination; and at the close of the laboratory course, by a practical examination in Qualitative Analysis. My experience at St. Bartholomew's Hospital, during the six years I occupied the chemical chair, led me to the conclusion that the chemical instruction in the medical schools of the metropolis is rendered nearly useless by the omission of any sufficient and obligatory examination at its close.

The following would be, in my opinion, the kind of curriculum of chemical instruction which it would be desirable to follow :—

1*st*. A course of twenty-five lectures on Physics.

2*nd*. A course of forty lectures on Mineral Chemistry.

3*rd*. A course of thirty lectures on Organic Chemistry.

4*th*. A course of practical instruction in Qualitative Analysis, extending over three months.

In conclusion, I would beg to observe that the whole of the foregoing course of Chemical instruction ought to precede the medical curriculum; and it is to be hoped that the introduction of the study of the physical sciences into primary and secondary schools will, before many years elapse, render this possible. The medical curriculum would then include only the special applications of Chemistry to medicine. The chemical instruction would in fact begin where, in the above scheme, it leaves off, and the medical student would acquire such an amount of training in physical science as would enable him to grapple effectively with the chemical and physical problems which he will daily encounter in the practice of his profession. For the scheme above sketched out, the following might then be substituted :—

1*st*. A course of fifteen lectures on the applications of Physics to Medicine and Surgery, including the special physics of the eye and ear.

2*nd*. A course of practical instruction in a physical laboratory, extending over one month.

3*rd*. A course of about thirty lectures on the special applications of Chemistry to Medicine.

4th. A course of two months' practical instruction in a chemical laboratory, in those branches of Qualitative and Quantitative Analysis which have a special bearing upon the practice of Medicine.

It is obvious that these special, or, as they may with propriety be called technical, applications of the physical sciences cannot possibly be taught to any purpose unless the student has already made himself thoroughly acquainted with the sciences themselves.

G. D. LIVEING, Esq., *Cambridge.*

With regard to your letter of the 4th ult., I have the following observations to offer :—

1. "As to the topics to be included under Chemistry."

It seems to me quite unnecessary that the medical student should be acquainted with many of the details into which Chemistry has now expanded; but it is of the utmost importance that he should understand the general principles and laws. These may, I think, be sufficiently well illustrated by the simpler combinations of Inorganic Chemistry, omitting altogether the rare elements, and all compounds which are not either of common occurrence or in some way of a typical character. The knowledge of Organic Chemistry exacted might very well be limited to one or two well defined series, and the leading properties of a few of the most important proximate constituents of animal and vegetable bodies. I do not mean to say that a further acquaintance with Organic Chemistry would not be of great service to a medical student, but that it is undesirable to exact or expect it. It is quite impossible in the case of a progressive science like Chemistry, to lay down any limitations which shall be suitable for many years in succession; so that it is best that each examining body should draw up some sort of schedule specifying the extent, so far as the facts of Chemistry are concerned, which will be included in its examinations; and that these limits should be narrow, and thorough knowledge rather than a diffuse one exacted,—a knowledge of principles and their application, rather than of minute facts. A knowledge of a multitude of facts may be necessary in some of the more strictly professional sciences, but is too often the only kind of knowledge which a medical student aims at. Much knowledge of analysis does not appear to me to be called for, because few medical men can ever become trustworthy toxicologists, and the detection with certainty of single acids and bases of common occurrence, is about as much as can be expected of the mass of students. The practice in manipulation needed for attaining this point will

be sufficient to enable them to tell one thing from another, and to apply properly the tests for most of the common impurities in pharmaceutical preparations. While, however, I would restrict within narrow limits the acquaintance with the facts of Chemistry which should be exacted of medical students, there is another direction in which I think it very undesirable to contract the definition of Chemistry, namely, in regard to the allied branches of physics. The experimental laws of heat, and, to some extent, those of electricity also, should be embraced within the course. They are not strictly Chemistry, but so intimately connected, not merely with chemical action but with all forms of physical action, that a knowledge of them is almost essential to the due study of physiology and such like subjects. In order to avoid all ambiguity, it would be well, I think, if the Council would state specifically, as a recommendation, that the experimental laws of heat and electricity should be included under the head of Chemistry. The limits of the examinations in these branches must be defined from time to time, as in the case of Chemistry proper. These limits may be very narrow in the case of electricity, and so chosen as to tax the memory as little as possible, but bring out a knowledge of the general laws, because these sciences are for the medical student only ancillary to the study of other things; and it is the application of their principles to other sciences, such as Physiology, which it is most important for him to understand. This leads me to the second question :—

2. "As to the period in the four years' course in which Chemistry may best be studied, and the time to be devoted to it."

Since Chemistry may be said to underlie all the other sciences prescribed for the medical student, inasmuch as it treats of properties of matter which are of a general character and are independent of the mere form of the matter, it ought plainly to be the first studied ; and, I think, the study of it ought to be concluded in the first year. When there are many new ideas to be gained, they do not present themselves in definite form or with sufficient clearness at first, so that I do not consider that less than a year is time enough to allow to Chemistry ; but the student can hardly afford to give more time to it than this, at least if he give so much attention to it that he may be said to be studying it during that time. I have a very decided opinion that it would be to the advantage of medical students in general if they were put through their examination in Chemistry at the end of the first year of their course, in order that they may learn it in a definite way while they are about it, and because it is often slurred over at first, and thereby the very use of it in its application to other subjects is lost. It is this application of it, which I regard as of real importance, that a medical student should understand ; and, for this reason, I would insist on it as a preliminary study, but free him from the burden of any examination in it, *as a distinct science*, at a later period of the course.

3. "With regard to the manner of teaching Chemistry."

I do not think that anything else can entirely supersede formal lectures with experimental illustrations, for in no other way can the broad features and general principles be so well brought before the student. At the same time, no lectures, in which the professor is the sole speaker and experimenter, afford by themselves adequate instruction for ordinary minds, which require to have the same point put before them more than once and from several points of view. A system of catechetical lectures in classes not exceeding 15 or 18, in which each student in turn may act as demonstrator, and answer the questions of his fellow students under the superintendence of a teacher, seems to me the best supplement to the formal lectures before mentioned. In these classes the simpler experiments shown in the formal lectures might be repeated by the students, and they might be made to work out numerical and other examples of the application of the laws, for in no other way can they so well arrive at a comprehension of the practical bearing of these laws. I need not add that practical analysis can only be learnt by actual manipulation.

Dr. STEVENSON MACADAM, *Edinburgh.*

In reply to your letter of date 4th August, I beg to submit the following opinion on the points submitted to me :—

1. "The topics which may most advantageously be included under the subject of Chemistry" are—

The Non-Metallic Elements ;

The Metallic Elements, especially in relation to their medicinal compounds ;

Organic Chemistry, including the Amylaceous and Saccharine groups ; the Albuminous group ; the Alcohols, Ethers, and Acids ; the Oils and Fats ; the Alkaloids, and Cyanogen and its compounds ; and Chemical Philosophy.

2. "The period in a four years' course when Chemistry can be most profitably studied" is the first year, as a knowledge of Chemistry is essential to the study of Materia Medica, Physiology, and Practice of Medicine ; and the length of time which should be devoted to it should not be less than eight months.

3. "The manner in which Chemistry can best be taught" is by a course of lectures, extending over five or six months ; and by instruction in Practical Chemistry or analysis during three months.

The only other observation which occurs to me as deserving of attention is

in regard to the mode of conducting the examinations of students in Chemistry, which should be both oral and written on the subject of the lectures, and be thoroughly practical in the case of Practical Chemistry. The latter point may be gained by calling upon the student to exhibit his skill in the testing or detection of substances, especially those of a poisonous or medicinal nature.

Dr. WM. MARCET, *London.*

SCHEME OF MEDICAL TUITION FOR THE FIRST TWO YEARS, WITH ITS RELATIONS MAINLY TO CHEMISTRY.

FIRST YEAR.

WINTER SESSION.

Anatomy. *Physiology.*

For Three Months.—(Lectures) *Elements of Chemistry* including Natural Philosophy, partly as an introduction to Materia Medica.

SUMMER SESSION.

Botany, *Practical Physiology* (Microscope), *Materia Medica.*

SECOND YEAR.

WINTER SESSION.

Chemistry.

Anatomy (General).

Demonstrations and Dissections applied to Surgery, &c.

Last two months.—*Practical Chemistry* in a laboratory to apply tests and determine specific gravities with a balance.

SUMMER SESSION.

Practical Chemistry (in a laboratory) including Toxicology and the other subjects treated in the course of lectures (except the application of tests).

Dispensing and Pharmaceutical Chemistry.

Course of Lectures on CHEMISTRY (applied to Medicine), divided into Three Parts.

PART I. would include—

The elements and laws of Chemistry.
A few lectures on Natural Philosophy.
The Chemistry of the Metalloids.
The Chemistry of those metals, the compounds of which are described in the *British Pharmacopœia* (including metallic poisons).
Salts.
A few lectures on compound varieties, fermentation and putrefaction of the alcohols and organic acids.

A portion of Part I. would form the subject of the short course of lectures in the First Winter Session.

PART II. would include—

Chemistry applied to Physiology, &c.
Constituents of the Blood.
„ „ Tissues (fats).
„ „ Secretions.
their preparation and properties; quantitative determination of the organic and mineral constituents of the animal fluids and tissues, by gravimetric and volumetric methods.
The Chemical phenomena of digestion.

PART III. would include—

Chemistry applied to Toxicology.
Detection of Poisons—
In contents of stomach and bowels.
In secretions.
In tissues.
Chemistry and detection of organic poisons.
Chemistry applied to Hygiene:
Adulterations of food, and their detection (*a very important subject*).
Impurities in water, and their detection.
Impurities in air, and their detection.

This plan for the clinical instruction of medical students infers that the subject of Chemistry applied to Physiology is omitted from, or treated most superficially in the course of Physiology.

According to this arrangement, the course of lectures on Physiology will precede that on Chemistry, which is necessary in order to enable the chemical course to include the subject of Chemistry applied to Physiology. It will also have the advantage of grouping together the study of the structure and functions of the body. During the last two or three months of the first Winter Session, a certain number of lectures might be delivered on the

elements of Chemistry, including Natural Philosophy and the general laws of Chemical Science, which might be made to some extent an introduction to Materia Medica. The advantage of this arrangement would be mainly, that time would be allowed for the course of lectures on Chemistry in the second winter, to include Chemistry applied to Physiology and Toxicology, which it ought to do.

The course of lectures on Chemistry would be delivered in the second Winter Session, when the student's capabilities to master that branch of medical knowledge, considered as rather difficult, will be naturally greater than at the beginning of his medical studies. It will be found, I believe, an advantage to give practical instruction in the application of tests in the last part of the second Winter Session, which will give more time to Practical Chemistry applied to Physiology, Toxicology and Hygiene in the second Summer Session.

Instruction in Practical Chemistry would be conducted in a laboratory during the second Summer Session. This course should be strictly confined to Practical Chemistry applied to Physiology, Toxicology, and Hygiene; it being understood that the student has acquired, practically, the knowledge of chemical tests in the second Winter Session. I believe that Chemistry applied to disease, such as the examination of samples of morbid urine, had better be studied at the bed-side, or in a hospital-ward under the physician's directions.

The course of Practical Chemistry should take up two hours throughout, in succession, four or five days in the week. The student should prepare under the immediate direction of the professor, samples of the constituents of the blood, tissues, and secretions, and preserve them so as to retain a collection of these substances, which he can refer to in after-life when necessary. He should also go through the quantitative determination of the mineral constituents of the animal fluids and tissues, and be instructed in the use of dialysers.

With respect to Toxicology, the students should acquire a practical knowledge *of the extraction of poisons from organic mixtures, and from tissues and secretions*, and of their tests.

Practical Chemistry, applied to Hygiene, will include the examination of food for the detection of its adulterations. The analysis of water, and more especially the detection of its impurities (considered as unwholesome), and the detection of impurities in air.

A. F. MARRECO, Esq., *Durham.*

In answer to paragraph 5, I wish respectfully to state my conviction:

1. That the student in medicine should *not* be registered under the age of seventeen.

2. That during his first Winter Session his attention should be given absolutely to Anatomy and Chemistry, and that time would ultimately be saved by this.

3. That *no* course of instruction will accomplish its end, which is not followed up by a rigid testing, practical and theoretical, of the student's acquirements; and that a subject not so examined in, had better be omitted from the curriculum at once.

Finally, that there is no subject of medical education, in which reform would be at once more beneficial to students, and welcome to its teachers, than Chemistry.

ANSWERS TO QUESTIONS.

1. The general principles of Chemical Physics and Chemistry.

The details of Chemistry which the student in medicine is to apply to the study of—

(*a.*) Physiology.
(*b.*) Materia Medica.
(*c.*) Medicine.
(*d.*) Medical Jurisprudence.

In these details, I conceive, the student should be thoroughly prepared, before attempting the above courses, and the lecturers should be entitled to assume that he is so prepared, instead of attempting their exposition, to the exclusion of their own legitimate work.

2. Decidedly, in the first Winter Session, and in two courses of three months each afterwards.

3. Six months tutorial lectures, every fact being demonstrated as far as possible.

Repetition by the student, under supervision, of a very large portion of the experiments in this course. (*See Examples.*)

Two practical courses of the analysis connected with—

(*a.*) Clinical Medicine,
(*b.*) Medical Jurisprudence,

to be attended while the student follows these subjects.*

On reading over these answers I would wish to add these remarks:

1*st.* I am speaking from the point of view of a small school where, no doubt, the tutorial plan of teaching is more workable than in a large one.

* I cannot exemplify the kind of course contemplated better than by saying that I should use the 3rd and 4th parts of Dr. ODLING'S Manual as text-book.

2*nd*. I am strongly opposed to allowing students to register up to the 15th of the first month. I have seen enough to convince me of the pernicious effects of this regulation, and I think forty-eight hours grace, ample.

EXAMPLE OF LABORATORY PRACTICE—FIRST WINTER.

Week's Lectures.

Chlorine and compounds (experiments as in text books).
Iodine, bromine, and their compounds.

Laboratory Practice.

Chlorine. Analytical characters of gas in solution.
Action on organic matter.
Chlorides. Disengagement of chlorine from—of hydroch. acid from—distinction of hyd : acid from—metallic chloride by tests.
Characters of chloride of silver.
Oxides of Chlorine. Recognition of bleaching salts—of chlorates.
Iodine and Bromine. Separation from compounds and identification.

Dr. WILLIAM ALLEN MILLER, *London.*

In replying to your circular letter on the subject of Medical Education, dated 4th August, 1868, I shall address myself to your questions in the order in which they are proposed.

1. "The topics which may most advantageously be included under the subject of Chemistry" appear to me to be these—

(*a.*) Chemistry of the non-metallic elements, illustrating the laws of chemical combination.

(*b.*) Chemistry of the metals employed in medicine and in the arts, with an explanation of the principles of the classification of crystals.

(*c.*) Organic Chemistry.

(*d.*) Elements of chemical qualitative analysis, including the detection of the principal acids and bases, both inorganic and organic, and the more important poisons.

The extent of detail into which it may be wise to enter, especially in the branch of Organic Chemistry, can scarcely be defined in a letter, and under any circumstances must be left to the judgment of the teacher; though it would not be very difficult to draw up a statement in outline of the minimum range of subjects upon which the student might be required to be prepared for examination.

The applications of Chemistry to Physiology should be dealt with by the physiologist ; and, if I may venture a remark in passing, on a subject not my own, I think that this portion of the study of Physiology should not be given during the first Winter Session.

2. "The period during which Chemistry may be best studied in a four years' course," is during the first and second years.

I am of opinion that it would be an advantage to the student to commence his studies in May instead of in October. During this Summer Session a preliminary course of Experimental Physics should form a part of his curriculum. This would prove a fitting introduction to his chemical pursuits.

Such a course of physics should include—

(*a.*) The elementary principles of Mechanics and Hydrostatics. The balance, with the methods of weighing and taking specific gravities.

(*b.*) Pneumatics, introducing the description of the air-pump, the household pump and the barometer.

(*c.*) Heat, with the use of the thermometer and hygrometer.

(*d.*) Electricity, both of the ordinary machine and the voltaic battery.

(*e.*) Optics, so far as to explain the use of mirrors and lenses, the construction of the microscope and the telescope, and the optical arrangement of the eye. Dispersion of light and the prismatic spectrum.

(*f.*) Sound, and the principle on which the musical scale is constructed.

These subjects might be treated in from forty to fifty lectures. I attach great importance to this distinct study of physics. The lectures should be copiously illustrated by experiments, tables and diagrams, and explanation of apparatus ; due progress of the students should be tested by frequent oral and written examinations.

3. I proceed now to consider the third question, viz., "as to the manner in which Chemistry can best be taught."

This course of experimental physics will have prepared the student for a course of lectures on Chemistry, which may be given as at present, during the first Winter Session. It may occupy from eighty to one hundred lectures, including frequent examinations, both oral and written.

Without such examinations, neither teacher nor pupil can really judge of the progress which is being made. In the conduct of these examinations and the reading of the answers written, the lecturer would need the aid of his demonstrator, and would do wisely in associating him with himself in this necessary but laborious portion of his duty.

It is scarcely necessary to say that the chemical lectures should not be merely didactic, they must be demonstrative, and so arranged as to develop the logical faculty of the listener, and consequently should be abundantly illustrated by experiments, as well as aided by diagrams and tables.

A single course of lectures is all that need be insisted on. Indeed, in no

case do I think, whatever be the subject, that the student should be compelled to attend the same course of lectures a second time.

The practical teaching of Chemistry must be conducted in a laboratory fitted up for the purpose. Here the pupil must himself perform the operations of testing and analysis under the eye of the teacher. Such a course is as necessary for the acquisition of a knowledge of Chemistry as the practice of dissection is to the study of Anatomy; but the student need not devote so long a time to the practice of Chemistry as to Dissection. Thirty or forty demonstrations of two hours each might suffice, and these might advantageously be carried on simultaneously with the chemical lectures, though in practice it would probably be found more convenient to conduct them during the summer—which, if my proposal were carried out, would be the Second Summer Session.

The general suggestions, which, in accordance with the invitation of the Committee, I would make, are these :—

1. That there be a preliminary Summer Session.
2. That during this session, lectures be given :
 (*a.*) On Elementary Physics.
 (*b.*) On Botany.
 (*c.*) That without a formal course of lectures the student be introduced to the study of Osteology, under the guidance of the demonstrator of Anatomy.
3. That there be no compulsory attendance a second time upon the same course of lectures.
4. That those courses of lectures which are not demonstrative should be, where possible, abridged, whilst clinical teaching should be increased.

Dr. ALFRED S. TAYLOR, *London.*

1. "The topics which may most advantageously be included under the subject of Chemistry."

Having regard to the very proper restriction of this inquiry, namely, that the course of study laid down should comprise what is necessary to enable students to obtain the requisite knowledge and skill for the practice of the medical profession, I am of opinion that the topics which may be most advantageously included under the subject of Chemistry are the following :

The properties of the metalloids or non-metals—their uses and application in Medicine and the Arts,—the compounds which they form with each other, and the properties of these compounds.

Under this head I include the following bodies :—oxygen, hydrogen,

nitrogen, chlorine, bromine, iodine, sulphur-phosphorus and carbon. There are other elementary bodies belonging to this group, namely, selemium, fluorine, boron, and selicon, which are of minor importance, and need not enter into a course of Chemistry for medical students. In a medical point of view they are of no interest.

The metalloids selected for illustration in a course of medical Chemistry comprise all those which build up organic compounds, and constitute animal and vegetable substances in the various forms in which they present themselves. The atmosphere, earth, and sea are largely formed of them; and their compounds have important relations to medical science and practice. Most of the facts connected with these elements and their compounds admit of demonstration at the lecture-table, and the experiments themselves are of a nature to fix and attract the attention of a medical student, and to make him take an interest in the study of the subject. The chemical history of oxygen, hydrogen, nitrogen, chlorine, and carbon, comprises a large range of science, throwing light upon many questions connected with Physiology, Pathology, and the practice of Medicine.

The metals form a very extensive group of elements, numbering about fifty-three, but the greater number of them have no interest in a medical point of view, and a description of these and their properties might be fairly omitted from a course of lectures and demonstrations intended for students of Medicine. This branch of Chemistry as a subject for teaching might, it appears to me, be reduced to the following heads :—

(*a*.) Those metals which form the alkalies and alkaline salts.

(*b*.) Common metals and their salts, which are used in Medicine, *e.g*., mercury, copper, lead, iron, zinc, aluminium, silver, arsenic, and antimony.

In addition to the selected metalloids and metals above mentioned, there is another topic which must be included in the course of chemical instruction for the medical student, namely, Organic Chemistry, comprising the chemistry of vegetable and animal substances, their properties and uses. The study of the metalloids and metals should precede the study of organic compounds, and form a basis for it.

This topic should include a knowledge of the properties of the solids and fluids of the animal body with the changes which arise from disease, so far as they are demonstrable by Chemistry.

Although not specially referred to as a part of pure Chemistry, it would be desirable that a medical student should be instructed in the methods for determining the purity and strength of the principal compounds used in Medicine, and that he should have a knowledge of the common impurities likely to be found in medicines, and of the methods of detecting them.

There are, I believe, two defects in the present system of teaching Chemistry in the medical schools. 1. Physics form too large a portion of

the eourse, to the exelusion of Chemistry proper; and 2nd. There is too great a disposition on the part of teaehers to go into the refinements of the science, and to oceupy much valuable time in the illustration of subjeets whieh have little or no conneetion with Mcdieine or medieal praetiee.

With regard to the first point, I would remark that, even with the rcdueed number of topics rceommcnded in this paper, there is quite cnough of Chemistry proper to occupy the teacher and student, without eneroaching upon other branches of science. Physies, ineluding heat, light, eleetricity, and magnetism, are now of suffieient extent and importanee to be taught in a separate eourse of instruction. They cannot be introdueed into a Chemical course without rendering it neeessary to *omit much which is strictly Chemical.* In one of the most popular manuals of Chemistry for English students—(Fowne's "Chemistry")—it will be seen that nearly one-half of the book is oeeupied with Physies, to the exclusion of mueh useful information in Chcmistry proper.

Of the second defeet, I will only observe that it has been eneouraged, and is chiefly maintained, by the mode of examination adopted by some of the Examining Boards, especially of the University of London. The questions put to candidates are such as would be appropriate if they intended to beeome Professors of Chemistry or Chemical Philosophy. These questions often involve subjects quite removed from Medieine or medical practiee; and if the student is prepared to answer such qucstions, he owes the power to a system of eramming, or special instruetion to meet the requirements of the examiners whose peculiar views are known. Some leeturers, having a desire to prevent the systcm of grinding or cramming for examinations, find it neeessary to introduce into their lectures topics whieh they would otherwise exclude. A medieal student looks elosely to what is likely to form the subjeet of examination for the diploma.

2. "The period in a four years' course when it (Chemistry) can be most profitably studied, and the length of time which should be devoted to it."

I am of opinion that the best period in a four years' course for the study of Chemistry is as it is now fixed, namely, during the first year's attendance. There is much to fix the attention of students in thus beginning with a seienee whieh admits of the demonstration of its principal faets. In addition to the interest thus excited, Chemistry is a seienee whieh, when properly taught, trains the mind to aeeuraey of reasoning.

If I make any exeeption to this remark, it is that the leetures on Organic Chemistry might admit of postponement until the student has madc some advanee in Physiology and Pathology; say, to the seeond or third ycar of study. The applications of Chemistry to Medieine would be then more apparent, and their valuc better appreeiated.

The student of the first year might profitably take up the Chemistry of

the metalloids and metals, the organic compounds being reserved for the second or third year.

This arrangement might lead to the necessity of dividing the Chair of Chemistry into Inorganic and Organic, including Physiological and Pathological Chemistry; the former being adapted for commencing, and the latter for advanced students.

In reference to the length of time which should be devoted to Chemistry during a four years' course of study, I beg leave to make the following suggestions :—

Assuming that the system of teaching by *lectures* will be retained, with some modifications, I am of opinion that three lectures weekly are as many as can be attended by a medical student with profit to himself. He has not only to receive, but to digest the knowledge imparted by the lecturer. To require an attendance on chemical lectures more frequently, is only likely to produce confusion in the mind of a student. The chemical knowledge acquired by a student does not depend on the *number*, but on the quality of the lectures; on the mode in which the facts are imparted, and whether there is a sufficient interval between any two lectures to allow him to think well of the subject, and arrange the matter in his mind.

The present curriculum, from October 1 to March 31, comprises about thirty weeks. Deducting two weeks for the Christmas vacation, this would give a total of twenty-eight weeks; thus allowing, at the rate of three lectures weekly, eighty-four lectures on Chemistry in one medical session. These are too numerous. Students, I believe, become wearied with the subject, and the number of lectures upon it, long before the close of the medical session. They cease to attend the lectures. It has been, I believe, observed in most medical schools of the metropolis, that the attendance on chemical lectures falls off very much after the Christmas recess, *i.e.*, after the first half of the medical session.

If the Chemical Chair is not divided, I am of opinion that 70 lectures on this subject during the first year of study would be sufficient for a student of Medicine, namely, 25 on the non-metals, or metalloids; 15 on the metals; and 30 on Organic and Pathological Chemistry. If the Chemical Chair is divided, I am of opinion that Inorganic Chemistry, adapted for a medical student, might be comprised in 50 lectures as a maximum, delivered on two days weekly during the first year; and Organic Chemistry, in from 30 to 35 lectures, delivered in the second or third year of his attendance in the latter half of the medical session.

3. "The manner in which it (Chemistry) can best be taught—by lectures, practical instruction, or otherwise."

I am of opinion that for the proper teaching of Chemistry, lectures should be combined with practical instruction in a laboratory. Apart from the fact that lectures are fitted to convey to a student information not readily found

in books, they are well adapted to give to him that general knowledge of the science which should precede a course of practical instruction. They not only serve to point out to him the proper subjects for experiment, but they also show the mode in which experiments should be performed. No description in books can supply the place of this sort of demonstration. A lecture furnishes a sort of skelcton-map, which the student should fill up by practice in the laboratory. Before he can derive benefit from this mode of instruction, he ought to have a general knowledge of the properties of chemical re-agents, the mode of using them, and the apparatus required. This kind of knowledge which is imparted by lectures, is essential, not merely for the proper, but for the safe performance of experiments. Not to mention the great waste of chemicals by students who have not had this preliminary instruction, there is great danger in sending them into a laboratory to work without constant supervision. It is wholly different in this respect from the study of practical Anatomy by dissections. The uninformed chemical student, by the thoughtless admixture of certain substances, may place his life in danger, or do permanent injury to himself or his fellow-students. Constant supervision of each student may prevent accidents of this kind, but this is hardly admissible in a medical school. With respect to the time at which practical instruction should be imparted in a laboratory, I would observe that it should follow as soon as possible after attendance on the course of lectures. This instruction should also be restricted to those subjects which have been brought before the student in the lectures. A student derives no benefit if he is allowed to perform experiments in a desultory manner, and without any object in view. Many of them look only to what is showy and striking, and neglect those which are simply instructive.

Having regard to the fact that the chemical instruction here described is intended for students of Medicine, to aid them in the future practice of their profession, I think an attendance for ten weeks in the laboratory—three days weekly, and for three hours on each day—would be sufficient. This would make thirty days' attendance in the whole. The student should not be wearied with minute details, or with the working of elaborate and refined chemical processes which are not likely to be required in the practice of his profession. He should be made to feel an interest in the performance of his experiments, and that there is a practical object to be obtained by the results. This interest is destroyed when he is made to work for too many days, or too many hours a day.

In these remarks I have assigned numbers to the lectures, and fixed the intervals which should elapse between them. If the exigencies of medical and surgical practice required it, a further reduction in the number of lectures might be made, their place being supplied by an addition to the number of days assigned to practical instruction in the laboratory.

In employing the term "lectures" as one of the methods of instruction, in the remarks above made, I would observe that this term is hardly correct. A *chemical* lecture should be a "demonstration of facts" by experiments, with such observations as are necessary to make the results intelligible to the minds of beginners.

Dr. ALEX. W. WILLIAMSON, *London.*

With respect to the first of the three questions asked, I am of opinion that Chemical Physics (including the elements of heat, light, and electricity) ought to be included in the course of Chemistry, until such time as the students may come prepared with a knowledge of those subjects;—that the more specially chemical part of the course ought to include a study of the best known properties and transformations of common acids, salts, &c., and of the simplest and best-understood organic bodies, such as would occupy about one hundred lectures of an hour each;—that such instruction ought to be followed by practical instruction in the tests of the most important inorganic acids, salts, &c., sufficient to enable the student not only to detect any of them with facility, but to give good evidence of his conclusions. Such practical instruction is given in about forty lessons of one hour each, in which the students work *simultaneously* at each substance in its turn, and receive their general directions simultaneously. These "practical classes" are singularly effective. I have known students attend them without previous instruction in theories, but in all cases with little or no benefit.

With respect to your second question, I am not only of opinion that the study of Chemistry ought as usual to occupy the commencement of a four years' course of study, but also that it ought to receive a greater proportion of the students' attention, while it lasted, than is commonly the case. Very few young men can really study Chemistry, Anatomy, and Physiology simultaneously, and the regulations which require them to do what is really beyond their power do harm in many cases. Some students are discouraged altogether, others work at one of the three prescribed subjects, merely attending lectures in the other two, and the more apparent usefulness of Anatomy or Physiology leads many of them to sacrifice Chemistry. For these and other reasons, I am inclined to think that the study of Chemistry ought to precede that of Physiology.

Practical Chemistry being naturally, and very properly, a summer course, succeeding the theoretical winter course, is far less engrossing, and may proceed simultaneously with a greater number of subjects.

The above remarks, although specially relating to your first two questions, contain the substance of my views on the subject of the third question.

The only way in which a real gain of time can be effected in the study of Chemistry is to render the teaching more effective while it lasts. Students lose time by attending lectures to the subject of which they cannot give due study, and it is not possible for teachers whose minds are in great part engrossed with professional matter of another kind to do for their pupils what, by greater concentration of their energies, would be profitable for them. Students must not be compelled to attend lectures irrespective of their process of study, and driven to acquire a show of knowledge for the purpose of passing an examination. On the other hand, every teacher ought to be so earnestly devoted to his own branch of science as to impart some enthusiasm to his students, and give them an interest in their work. I doubt if any one really works his best until he is made to love his work.

I would gladly pursue these considerations to a practical conclusion were I not afraid of going beyond the field of inquiry which you have traced out.

ANATOMY AND PHYSIOLOGY.

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REPLIES.

Dr. LIONEL S. BEALE, *London.*

The subjects which in my opinion should be included under the head of Anatomy and Physiology are as follows :—

1. The minute anatomy of all tissues and organs of the body, with a description of their actions and chemical composition : Physiology proper, including a brief statement of general physiological knowledge of the present day. The different forms of apparatus used by Dubois Reymond, Helmholtz, Marey, and others should be seen by the student, and the mode of using them described. Minute Anatomy cannot be properly taught unless each student is made to work practically with the microscope, and learns to demonstrate for himself. Moreover, he should be practically acquainted with the elements of Physiological Chemistry.

2. I think these subjects should be taught during the first and second years, and would venture to urge very strongly the importance of an examination at the end of the *first* Winter Session. A course of more advanced Physiology and Pathology would be advantageous after the student had passed his examinations ; but such would of course be given as soon as the demand for increased information arose, which would be necessarily excited by an improved training during the early years of studentship.

3. Minute Anatomy ought to be taught practically as well as by lectures. A large room where students can work in connection with the physiological department and study microscopical investigation is as important as the dissecting room. It is also most desirable that a good physiological laboratory should be attached to every large school. This would entail a considerable expenditure and the appointment of several demonstrators ; but in my opinion it is so necessary that the fees paid by the students should be considerably increased, in order that a more thorough system of teaching than is at present possible in most schools might be carried out.

It may be said there is no time for Minute Anatomy, but any one who knows how the student's time is now cut up and frittered away will feel that he might easily learn very much more than he now learns during the winter Session. In my judgment it appears absurd to allow a number of utterly ignorant men to walk about the wards of an hospital, disturbing patients, gossiping with each other, looking at what they do not understand,

and wasting time that might be well employed in teaching them such things as the difference between dead and living bone, the characters of pus, the nature of an ulcer, the anatomy of the kidney, the structure and action of the heart, how to test urine for acid and alkali, albumen and sugar, &c., and a number of other things of great practical importance, of which many, I fear, are as ignorant when they are about to become practitioners as they were when they entered a medical school for the first time.

Dr. J. HUGHES BENNETT, *Edinburgh.*

In reply to the queries made to me by the Committee of the Medical Council, concerning Anatomy and Physiology, I beg to say—

1. That "the topics which may most advantageously be included under the subjects of Anatomy and Physiology" are—

(*a.*) The Descriptive and Surgical Anatomy of the human body.

(*b.*) General Anatomy, or Histology, and Physiology.

2. "The period in a four years' course when they can be most profitably studied" is, for Descriptive and Surgical Anatomy, the first two years, and for General Anatomy and Physiology, the second and third years.

3. "As to the manner in which they may be best taught," I observe that General Anatomy is regarded by the Council as a distinct subject. I am of opinion that it should constitute an essential portion of the instruction in Physiology, under the name of General Anatomy and Physiology, or of Histology and Physiology. I am satisfied that the attempts which have been made by some teachers in Scotland to unite General Anatomy or Histology with Anatomy rather than with Physiology have been most injurious and burdensome to the student.

The two important subjects of Descriptive and Surgical Anatomy and of Histology and Physiology should be taught both systematically and practically—that is, the first by lectures and by dissections, the second by lectures and in the physiological laboratory. Anatomical demonstrations should be confined to the dissecting-room and given to a limited number of students at a time, so as to secure that each one of them sees and examines the dissection shown. The conversion of these demonstrations into a winter course of lectures, given in the theatre—that is, a second daily or supplementary course of lectures on Anatomy, as is done in Edinburgh—is an unnecessary tax on the students' time and resources, and demands the interference of the Medical Council.

The necessity of insisting on Practical Physiology in the laboratory, as well as upon Practical Anatomy or Practical Chemistry, is daily becoming more evident. This course should consist in making the student—1. Prepare

and examine for himself under the microscope, with varying magnifying powers, all the tissues and fluids of the animal body; 2. Analyse chemically, qualitatively, and quantitatively the different animal fluids and solids; and 3. Practise the use of the various physical instruments and other methods now found to be necessary for making exact physiological observations.

Besides the distinct queries concerning Anatomy and Physiology, which I have answered to the best of my knowledge, the Committee say "they will feel obliged by any further observations or information which may occur to you as deserving of attention in connection with the subjects of their inquiry." Having taken great interest and paid special attention to the subject of medical education in this and foreign countries, I recently printed a pamphlet, in which my views are concisely stated. I herewith enclose a copy, begging it to be understood that the passages I have marked with ink in the margin may be regarded as expressing my opinions on the points deserving the attention of the Committee.

To what is there stated (p. 17), I now beg to add that recent circumstances have rendered it important for the Medical Council to declare that clinical studies should necessarily include, besides lectures, regular visits with the clinical teacher to the wards of an hospital, so as to give the students an opportunity of watching the progress and treatment of the cases he may refer to.

I observe that Morbid Anatomy and Pathology are not included among the subjects of medical education enumerated by the Council. On this subject I beg to refer to the observations (p. 14) of the pamphlet. Should it be thought, however, that these topics are capable of being best taught with some of the other subjects named, then I think those subjects should be distinctly stated, so that no misunderstanding may arise as to the nature of the lectures considered advisable by the Council. In this case lesions of internal organs may be described in the course of the practice of Physic, of surgical injuries in the course of Surgery, and of obstetrical diseases in the course of Midwifery, whilst general Pathology would then form a part of the course of Physiology, and practical Morbid Anatomy would be taught by the prosector in the hospital.

The following remarks (extracted from pamphlet) constitute my reply to the general inquiry of the Committee :—

1. What a Curriculum of Study ought now to be.

Practical should be combined with Systematic Teaching.—So far from the modern method of cultivating medicine being difficult, it everywhere renders the study not only more exact, but more easy. In former days a laborious system of inquiry into symptoms was necessary to determine whether an individual had disease of the lungs, and even then the result was mere con-

jecture. At present, percussion and auscultation of the chest are often sufficient to inform the physician as to the nature of the case, and so far is the conclusion from being doubtful, that the greatest certitude is thus frequently attained. If dropsy occur in an individual, and, on boiling or testing the urine in a glass tube, we find albumen in it, we recognize that the cause of that dropsy is disease of the kidney. If there be an eruption on the skin, and, by examining microscopically a little of the scab, we recognize that it contains the thalli and sporules of a fungus, it is placed among the parasitic diseases of the organ, and treated accordingly. Here, then, are examples of how auscultation, chemical tests, and the use of the microscope are directly serviceable in enabling us to arrive with certainty and with the greatest rapidity at a knowledge of disease. Can it correctly be said, in either of these cases, that such are useless details, and that the student should not be made acquainted with them? But it may be argued that, in order to arrive at these results, the student must learn auscultation, organic chemistry, and the use of the microscope, and that, according to the curriculum enjoined, there is no provision for teaching him these things. Now this is quite correct. According to the present system of education, the student is called upon to attend certain courses of lectures, and follow a certain amount of hospital practice. Whether he knows anything in reality is not required of him, so much as that at his examination he should be able to answer certain questions. Hence the necessity of poring over books—hence the multiplication of all sorts of manuals, in which the necessary information is condensed into the smallest compass—hence the cry against lectures, and the greater amount of time demanded for private reading. The truth is, that whilst every branch of medical study is becoming more practical, and demanding a more intimate acquaintance with things, we still adhere to a system of teaching and of examination that is too much directed to the memory alone. It thus happens that a student who has a thorough knowledge of Anatomy or of Practical Medicine, and who would exhibit real knowledge if examined with the subject before him, or at the bedside of the patient, is often puzzled by questions which his mere memory does not enable him to answer. And it still more frequently occurs, that men who could not cut down in the human body on any one nerve or artery, and who do not know a strong pulse from a weak one, or a moist from a dry rattle in the lung, pass brilliant examinations in consequence of the study of books and of good memories.

Now, there can be no doubt that much of this practical ignorance depends upon an absence of practical instruction. The student should be encouraged, not only to obtain his knowledge from lectures and from books, but he himself should be made to observe and learn from the direct use of his senses. It follows that every subject of real importance to be known should be learned, not only systematically from lectures and by reading, but also practically by the personal investigation of the student.

Lectures.—It has been said that lectures occasion loss of time to the student, and that better information can be obtained from private reading and reflection. But this cannot with correctness be said of such lectures as are good and well delivered. An able condensation of our existing knowledge, drawn up by one thoroughly acquainted with the subject, delivered orally, with proper emphasis and gesture, and illustrated by well-executed drawings and experiments, must be regarded as amongst the best means of instruction. But if the lecturer knows little of his subject, reads a monotonous compilation incapable of fixing the attention of his class, or has not sufficient means for illustration and experiment, then the lecture can produce little effect. What is required, then, is, not the suppression of lectures, but that such as are necessary should be well delivered and sufficiently illustrated. In short, pains should be taken to obtain good instructors; and this point, which has escaped all writers on the subject, is one which primarily demands the attention of the Medical Council.

The great fault of many systematic lectures at present is that they are not sufficiently elementary. Many learned, scientific, and accomplished men get tired of describing, year after year, the first principles or primary facts of their science or art. They forget that their hearers are only beginners; and, instead of adapting their teaching to the comprehension of the learner, they are too fond of assuming that their hearers know more than they really do, and of addressing themselves to the advanced student. A young lad of seventeen or eighteen, who has just left school, where he has been working hard to pass his preliminary examination, is suddenly introduced into the botanical, anatomical, or chemical class-room. He hears terms absolutely strange to his ears used with the greatest familiarity, and is rapidly led to study theories on subjects concerning the elementary facts of which he is profoundly ignorant. What can be more absurd than lecturing to the first year's students of Anatomy on the theories of growth by molecules, nuclei, and cells, or to those of Chemistry on the relations between digestion and muscular power? Such students, not having studied Physiology, are necessarily ignorant of the functions of growth, digestion, and muscular contraction, and cannot be supposed capable of comprehending the theoretical views so elaborately placed before them.

Another quality should be considered essential in every good systematic course—viz., that it should include a sketch of the entire subject. I know of nothing so injurious in teaching as that dwelling too minutely on numerous details, that over-lengthy description of topics, that too-copious illustration, that unnecessary division and sub-division, which preclude the possibility of completing the course. Some lecturers talk of the great extent of their particular subject, and purposely make it extend over two or more years. This is most unjust to the student: for there is no branch of medical education concerning which exactly the same thing cannot be said, and if

all were to act in this manner, from no one teacher could the student obtain a comprehensive idea of any department. It should, in my opinion, be the aim of the instructor so to condense and balance the various topics he treats of as to give his pupils an idea and general knowledge of the whole, and not to set forth an exhaustive criticism and description of all that has been accomplished or may be imagined. Where further study and more reflection on particular points are required, the student should be referred to monographs or special treatises, where he may obtain the necessary information.

The Subjects to be Taught.—When we come to consider what the subjects enjoined on the student ought to be, four great fundamental topics appear to be necessary, which, so far from being curtailed, ought to be most rigidly insisted on. They are Chemistry, Descriptive Anatomy, General Anatomy and Physiology, and Morbid Anatomy and Pathology. Each of these topics should be taught first systematically in such a comprehensive course as I have referred to, and then practically. Chemistry in the laboratory, Descriptive Anatomy in the dissecting-room, General Anatomy and Physiology in a physiological laboratory, and Morbid Anatomy and Pathology in the dead-room of a large hospital. Each of these great subjects should be directed by a professor, having under him one or more skilled assistants, with apartments, museums, apparatus, instruments, and everything necessary for enabling him not only to teach the subject as it exists, but to afford his advanced pupils the means of private research and experiment.

With regard to the necessity of these four fundamental subjects I need say little. That Anatomy and Chemistry should be taught both systematically and practically is universally admitted, but General Anatomy and Physiology equally demand a practical cultivation. For this purpose a microscope should be put into the hands of every student, who should be taught personally how to use and demonstrate with it. A chemical analysis of the organic tissues and fluids should be also enjoined on each, and an acquaintance with those inquiries connected with the digestive, circulatory, respiratory, nervous, muscular, and other functions of the economy, such as actual experiment can alone communicate. In 1862 it was stated by Dr. Sharpey, in his address on Physiology to the British Association, "that the great advancement on this subject is mainly owing to the establishment of schools of practical Physiology in various parts of Europe. Opportunities for the practical pursuit of Anatomy have long been deemed an indispensable requisite for that study. Chemical laboratories, where young men are trained to chemical research, have powerfully contributed to promote the science of Chemistry. To these are now added, in various schools on the Continent, and especially in Germany and Holland, physiological laboratories, in which opportunities are offered for the practical study of Structural Anatomy, Physiological Chemistry, and Experimental Physiology. In these

establishments encouragement is given, and facilities are offered, for original research; and all the requisite arrangements, with the best instrumental appliances, are provided for that purpose. Accordingly, many valuable physiological memoirs have emanated from the practical schools of Berlin, Dorpat, Würzburg, Utrecht, and elsewhere; and accomplished young professors and assistants have been supplied to the various German universities, there to carry on their independent researches."

But Morbid Anatomy and Pathology are by far too much neglected in many of our medical schools. The recent advances in Medicine have shown us the necessity of endeavouring by every means in our power to discover in the living body morbid states, and especially the actual morbid condition of various organs. The old system of nosologies and attention to functional symptoms are in themselves wholly incapable of determining, in many cases, the lesions which constitute disease; but when a knowledge of these is conjoined with that of physical signs and of Morbid Anatomy, we are then frequently capable of speaking with a precision which would have astonished our forefathers. This especially holds in cases of diseased lungs, heart, and kidneys. What exactitude, for example, has not been thrown over the whole class of cardiac diseases by the conjunction of physical signs and of Morbid Anatomy! But it too frequently happens that this latter subject is put off for consideration till the last year of a student's study, whereas it should obviously precede it. Clinically, our object is to discover the morbid state; but if we have no idea of that morbid state, how can we expect to find it? Hence in every medical school there should be a teacher of Morbid Anatomy and Special Pathology, in possession of all those facilities for teaching his subjects which a large hospital only can give.

I say nothing of Botany and Natural History, because I think they should be made altogether preliminary to professional education. I have had frequent opportunities of seeing how the dread of a botanical examination has so influenced the mind of the student during the two first years of his studies as, in order to prepare for it, to have induced great neglect of Anatomy and Physiology. Every facility, therefore, should be given to him for passing an early examination in Botany and Natural History. Insisting that this should be done at the end of the second Winter Session is, in my opinion, a mistake. A great improvement would be effected by the medical student commencing his studies everywhere in summer, and attending these classes. In such a case he is allowed in Edinburgh to present himself for his first examination at the conclusion of his first winter, but second medical session. This plan, which has received every support from my colleague, the Professor of Botany, has been found most advantageous to the student.

The other topics which require to be learned are Materia Medica and Pharmacy, Medical Jurisprudence, and the three great subjects of Midwifery, Surgery, and Medicine. Each of these subjects should also be taught

systematically and practically. The Professor of Materia Medica should superintend the students in their attempts to prepare medicines and put up prescriptions, and have the control of a pharmaceutical laboratory, with a skilled assistant, for that purpose. The Professor of Medical Jurisprudence should be the adviser of the police and of the law, as indeed is the case in many continental cities; so that not only may his students in the laboratory be enabled to exercise themselves in the art of detecting poisons, but be made familiar with criminal proceedures, draw up reports, investigate medico-legal cases, &c.

The three great branches of Surgery, Medicine, and Midwifery, I need scarcely say, have long been taught practically or clinically, as well as systematically. There can be little doubt that what is now required is to give greater extension to the former mode of instruction. And here I would observe that true clinical instruction does not consist in giving lectures in a class-room, however able they may be; but in seeing that the students really learn and exercise themselves at the bed-side in all that is necessary for rendering themselves efficient practitioners. I have known very intelligent young men who have followed courses of so-called Clinical Surgery, and even obtained prizes in that department, who, at the termination of their studies, did not know how to apply a bandage, set a fractured limb, or perform the simplest operation. In the same way, so-called clinical medical students have never examined a case, formed a diagnosis, written a prescription, or known the difference between a dry or moist sound in the lung. It has been alleged, indeed, that making patients serviceable for the teaching of students in an hospital is opposed to humanity. But this and similar objections are urged by persons who do not teach clinically as now explained, and who are apparently unacquainted with the fact that, not only have I practised this plan in the Royal Infirmary of Edinburgh for the last twenty years without inconvenience of any kind, but that at this moment clinical teaching is carried out in the distinguished schools of France, Germany, and Italy in the same manner.

It will be seen, therefore, that I consider every subject should be taught *practically* as well as systematically—that greater extension should be given to the first kind of instruction, whilst a repetition of systematic courses would then be unnecessary. Several of these even—more especially Materia Medica and Midwifery—might in all schools be curtailed to three months. I am happy to say that in the University of Edinburgh practical may now be combined with systematic teaching in all the essential departments of medical education, except Morbid Anatomy and Pharmacy. If the Chair of General Pathology were converted into one of Morbid Anatomy and Special Pathology, and connected more intimately with the pathological department of the Royal Infirmary, I am not aware that a better distribution of subjects necessary for teaching the art and science of Medicine could be made.

The Subjects to be taught under each Department should be defined.—One thing, however, is still needed to save the student from much repetition and loss of time. A central authority, such as the Medical Council, ought to define or cause to be understood from time to time what in the existing state of our knowledge should be comprehended under each department. In many schools the same subject is taught under various names, whilst in others the name does not prevent the teacher from lecturing upon any subject he pleases, however foreign it may be to his proper course. It has been contended by some that every instructor should be left to himself; that his genius should be unconfined, and that it would be impracticable and unadvisable to attempt drawing lines of demarcation where no natural boundaries really exist. This reasoning may seem very convenient for the teacher, but is, I apprehend, injurious to the student. The object of a medical school is to impart such a knowledge of the science and art of Medicine that after a sufficient time the student may be qualified to practise his profession, not only without danger to, but for the benefit of the community. As the whole subject is too extensive to be taught by one person, it is divided among several, each taking separate departments. But if it should happen, from want of understanding amongst themselves, from a feeling of rivalry with one another, or from a desire to attract students, that any one not only entrenches upon, but assumes the proper functions of another, it is clear some superior authority should interfere for the student's sake to prevent disorder. In old institutions where there are large endowments, the necessary duty may not be performed, or it may be handed over to an assistant. Or, with a view of increasing fees, unnecessary classes may be instituted, and what ought to be communicated in the essential course is, in truth, taught in a subordinate one. Or again, the elementary knowledge so necessary for the student may become so wearisome to the teacher, that he omits or hurries over it, or gets an assistant to teach it, while he enlarges on favourite speculative subjects, which his hearers are not prepared to understand. Such a mode of procedure is, as we have seen, most injurious to students, and is also unjust to his colleagues; for not only do the former not obtain what they require, but the novelty and freshness of some other essential course is taken away from them, when in proper time they have to attend it. Again, there are some teachers who maintain, because they have been appointed to teach—say Anatomy or Chemistry—that everything anatomical or chemical belongs to them and to no one else. For example, Anatomy, strictly speaking, comprehends a knowledge of the form, relative position, and connections of the various parts of organized beings, as determined by dissection. In a wider sense, it has been used to exhibit the structure of tissues and the analogies existing between different parts of animals; hence the terms general and comparative anatomy. Other terms have been introduced in reference to particular subjects of study; such as

regional or topographical, medical, surgical, obstetrical, physiological, and pathological anatomy. There is also an anatomy of plants. So with Chemistry, it may be mineral or organic, vegetable or animal, technological as applied to arts and manufactures, physiological or pathological. Now one teacher cannot communicate all the aspects of either Anatomy or Chemistry; and a desire to do so, or its being dependent upon caprice or individual inclination, can only give rise to confusion in medical study. I trust, therefore, that amongst the matters to be regulated by the Medical Council will be a clear statement of what each particular professor should embrace in his course.

The necessity of this is rendered more evident when it is considered how frequently students study in different schools, and the questions which constantly arise as to what class in this place shall be received as equivalent to another in that. For several years the University of Edinburgh received the class of General Anatomy and Physiology in the London schools as equivalent to the course of the Institutes of Medicine in the Scotch schools; but the former refused to regard the Institutes as equivalent to that of General Anatomy and Physiology. Even at present constant confusion arises from the different names given to similar kinds of instruction, or to classes which have been unnecessarily instituted and forced into the curriculum. Thus anatomical demonstrations in London mean the assistance given to the student in the dissecting room; while in Edinburgh they have been made to mean an extra complete course of Anatomy given in the theatre daily, during the Winter and Summer Sessions, by the demonstrator.

The topics now considered necessary in the most advanced schools, including Botany and Natural History, consist of eleven subjects, which might readily be followed by the student during four Winter and four Summer Sessions without the slightest fatigue. In fact, I have ascertained that the attendance on all these branches, systematic and practical, need never occupy him more than three or four hours daily; so that the whole science and art of Medicine would easily be taught in four years, giving ample time and opportunity to every student for perfecting himself in each branch before assuming the serious responsibilities of medical practice. (See Appendix.)

II. By whom Medicine should be taught.

The framing curricula and regulations as to the teaching of Medicine will be of little advantage unless means be taken to ensure that those who instruct are qualified for the duties they undertake. Much of the complaint that is made against this or that mode of teaching will be found on inquiry to originate, not so much in the form, as in the manner of teaching. I have previously stated that to ensure, as far as possible, proper instructors, is one of those tasks to which the Medical Council should give its best attention.

No one, it seems to me, ought to become a lecturer in Medicine unless he can show that, by previous studies both at home and abroad, he possesses—first, an extensive knowledge of his subject; and, secondly, the power and means of communicating what he knows to others.

For this purpose he should be examined in the science or art he professes to teach by five persons, all of whom are recognized as being eminent teachers or persons thoroughly conversant with the special subject. His means of illustration—such as the possession of, or access to, a museum containing the necessary preparations, the amount of diagrams, instruments, or apparatus required—should be investigated; and, lastly, he should be requested to give a lecture in public, as he would do it before a class, and his oratorical powers thus directly determined. There should also be some method of depriving him of his licence to teach, if his course be not well conducted, or if, instead of lecturing on the subject prescribed to him, that is neglected, while some other is substituted in its place.

There can be little doubt that it is the absence of such regulations that has caused so much dissatisfaction among students, as it obliges them to attend lecturers in no way distinguished in their various departments. The facility also with which individuals are allowed to teach, creates feelings of rivalry and a spirit of opposition, which, so far from being beneficial to education, is too often the reverse. What we require is a legislation which, instead of maintaining a system of rival institutions and opposing schools, perpetuating disunion and retarding the cause of scientific progress amongst us, will draw these discordant elements together, for the purpose of co-operation and mutual support. Nor is this impracticable, as such a constitution exists in most continental nations, and has been found to work admirably. To this end the various universities and corporations, instead of independent and contradictory action, should be empowered to carry out one system of education and privilege in the three divisions of the kingdom, subordinate to a uniform direction. Instead of numerous schools acting as rivals to and injuring one another, a machinery ought to be devised by which the talent now diffused and wasted should be concentrated under a wise administration, so as to strengthen instead of to weaken our great educational establishments. In this manner the strongest stimulus would be given to successful exertion, while ability and scientific merit might hope to meet something like adequate reward.

III. The Nature of the Examinations to which a Student should be subjected.

With examinations, as with teaching, the first point is to secure that the examiners thoroughly know the subjects upon which they examine, and are capable of eliciting from the student the amount of his knowledge. On

looking over the list of our examining boards, it will too often be seen that the gentlemen who compose them have never taught or especially studied the matters on which they examine. How can it be expected that medical practitioners engaged in the daily business of their profession, and conscientiously striving to cure and alleviate disease from morning to night among their patients, can keep themselves acquainted with the advanced scientific departments of medicine? Even in practical details they are often in arrear of the clinical schools. These, like the inexperienced lecturers, have recourse the night previous to an examination of the various manuals of the day, which if the student does not happen to be familiar with he runs great risk of rejection. The only sound rule to be followed on this subject is that the only parties capable of examining are experienced teachers, who, in consequence of annually reviewing their special subjects, must be cognizant of details. It is easy for boards or the Medical Council to regulate on paper what may appear to be an effective examination; but unless they secure good examiners, who will conscientiously perform their duty, all such regulations must be vain.

It is supposed by some that every member of the profession is qualified to examine on any branch of Medicine whatever. I know at least one corporation which has pertinaciously adhered to this doctrine for many years. Those who are acquainted with the actual condition of the various branches of medical knowledge, as now taught in the schools, will readily see how the carrying out of such a view accounts for the numbers introduced into the profession, who, as Dr. Parkes pointed out, cannot practise with safety.

For the same reason that teaching should be practical, so should examinations. Thus the candidate should be made to show his knowledge by naming objects placed before him, by performing chemical analyses or experiments himself, in displaying parts by dissection or objects under a microscope, and, above all, by showing at the bedside a sufficient knowledge of disease, of diagnosis, and of aptitude for treatment. It is only in this manner that the parrot system of repetition and of grinding can be got rid of, and the student's mind directed to the true objects of study. I am also satisfied that, in this manner, both teaching and examination would be rendered not only more interesting and satisfactory, but would be attended with far less fatigue and mental distress to the student.

To those, however, who look upon examinations from the old point of view, it appears to be a most difficult thing for the student to show any ability in art or practice. They urge that *that* must be the work of his after professional life, and that nothing more should be expected from him than a general knowledge of Medicine derived from books and lectures. But considerable experience in this matter has convinced me that nothing can be more laborious, wearisome, and in many cases useless, than this attempt to burden his memory. Surely a man who has carefully watched

a case of heart disease, listened to the morbid sounds produced, formed his own diagnosis or opinion of it, assisted in its treatment, and perhaps examined the heart after death, will know more of such heart disease, and remember it better, than one who has tried to get it up from lectures and books only; and the same reasoning applies to the acquirement of every other branch of medical study. Instead of a clinical teacher interrogating a student in a private room as to what he would do under such and such circumstances, would it not be better for the candidate not to answer questions like a parrot, but to *show* what he could do at the bed-side—first, in the way of diagnosis, and then in the way of treatment; whether it be by bandaging a limb, dressing an ulcer, distinguishing phthisis from bronchitis, or writing a prescription? These things must be learned sooner or later; and would it not be wise to see that they are acquired properly before the candidate proceeds to practise on the public? Until ideas of this kind are more extensively adopted, improvement in the teaching and examination of students is not to be expected.

On the other hand, if, through a patriotic act on the part of the Medical Council, a proper curriculum be established in this country, directed solely to benefit the student, and should both teaching and examination be made more practical, the educated youth will commence his career in a very different position, and be animated by a higher spirit than has hitherto prevailed. Medical science and practice, being familiar to him, will command more of his respect, and he will possess more real power of advancing its claims to public confidence. At least, I think it must be admitted that when the diploma which gives him the right to practise is put into his hand, he will by such a system be better qualified to act up to its statements, and commit fewer mistakes at the outset. If so, a great impulse must be communicated to medical education.

What our profession now requires is that elevation of sentiment and regard for the welfare of the whole body which will lead it onward in the scientific and practical improvements which everywhere characterize its rapid advancement. Some indeed, incapable of appreciating this advancement, see only contradiction in progress, and discordance in what really is greater harmony than has ever yet been effected by medical men. The Medical Council would vindicate its claim to public confidence by an endeavour to merge the conflicting interests of licensing boards and universities into the catholic desire of elevating the education of the profession to the same standard throughout the length and breadth of the land. That in a profession such as that of Medicine there should exist, not only in the same country, but in the same city, various examining boards, so managed that the candidate incapable of passing one should rush to another, with almost the certainty of obtaining his license, is a scandal to the community. Such should be abolished, and little jealousies and sneers as to the value of this

or that qualification ought to cease. It is by a like education, a like examination, and a like qualification, we shall learn to respect each other, diminish the petty feelings which opposing legislation and regulations have fostered, and by union and a combined effort seek not only to solve those problems which agitate our science, but place the whole body of its cultivators in just relation to the government on the one hand, and to the public on the other.

APPENDIX.

Plan of Medical Study to be Diffused over Four Years.

The essential branches of medical study are eleven in number, each of which should be taught systematically and practically. They are—1. Botany; 2. Natural History; 3. Chemistry; 4. Anatomy; 5. General Anatomy and Physiology; 6. Morbid Anatomy and Pathology; 7. Materia Medica; 8. Medical Jurisprudence; 9. Surgery; 10. Medicine; 11. Midwifery. They may be diffused over the four years, as follows, it being understood that modifications may be made to meet particular cases. This, indeed, will be necessary in schools where Materia Medica and Midwifery are taught in courses of three months during summer :—

First Summer Session.	Botany . . . Natural History	Systematic and Practical.
First Winter Session.	Systematic Anatomy. „ Chemistry. Practical Anatomy.	
Second Summer Session.	Practical Anatomy. „ Chemistry.	
Second Winter Session.	Systematic Surgery. „ General Anatomy and Physiology. „ Materia Medica and Pharmacy. Practical Anatomy.	
Third Summer Session.	Practical Physiology. „ or Clinical Surgery. „ Pharmacy. „ Anatomy.	

Third Winter Session.	Systematic Morbid Anatomy and Physiology. „ Medicine. Practical or Clinical Surgery.
Fourth Summer Session.	Systematic and Practical Medical Jurisprudence. Practical or Clinical Medicine. Dispensary Practice.
Fourth Winter Session.	Systematic and Practical Midwifery. Practical or Clinical Medicine. „ Morbid Anatomy.

By such an arrangement all the imperative branches of a good medical education, including the eleven subjects, each taught systematically and practically, may be diffused throughout the four Summer and Winter Sessions, without the slightest fatigue to the student. At no time will he be called upon to attend more than four lectures in the day at once, even when repetitious are necessary, so that there will be ample time for reading and reflection. These repetitions of systematic or practical lectures may be regulated by the wants of the student. As a general rule, two systematic courses of Anatomy, and of General Anatomy and Physiology, will be required. Practical Anatomy should be prosecuted in the dissecting room for at least two and in some cases three years. Clinical instruction in Surgery and Medicine will require at least nine months each—that is, a Winter and Summer Session. It will be wise, also, to enter to the hospital perpetually at the commencement of the first Winter Session, and ever after devote a portion of the day to the observation of cases. There will be also ample time to follow such special and extra classes as a particular direction of study or of practice may suggest—such as Ophthalmology, Insanity with visits to an asylum, Syphilitic Diseases, Operative Surgery, &c. &c., attendance on which should be encouraged in every great school of medicine.

Dr. P. BEVAN, *Dublin.*

In reply to your request that I would express an opinion on the best mode whereby "the various subjects of Medical Education may be taught with most advantage, and in what order they should be studied; and how the examinations on them may be arranged." I would beg to recommend a fixed order of study, not to be deviated from, except under peculiar circumstances :—

FIRST SESSION.

Winter (of Five Months). Anatomy (descriptive and general) of bones, muscles, ligaments, and abdominal viscera, with Chemistry (general).

Summer. Practical Chemistry.

SECOND SESSION.

Winter. Anatomy (descriptive and general), arterial, venous, lymphatics, and nervous systems.

Summer. Botany.

THIRD SESSION.

Winter. Physiology, Clinical lectures on Medicine and Surgery.

Summer. Materia Medica ; Pharmacy.

FOURTH SESSION.

Winter. Surgical Anatomy ; Senses ; Operative Surgery and Medicine.

Summer. Midwifery and Forensic Medicine.

Students should be examined by a Court of Examiners at the termination of each session, and obtain a certificate to enable them to attend the next class.

That Anatomy should be taught chiefly in the dissecting room ; but lectures on Anatomy are essential, for the following reasons :—

1. Pupils can never obtain more than half a subject each session, sometimes not so much, and the supply cannot be increased.

This amount of dissection is not sufficient, as, during the first session, the student is only learning to dissect, and must destroy many parts very essential —and as to permitting the demonstrators to dissect for him, that is a most injurious system, and should never be permitted ; one of the most important uses of dissecting being to teach the pupil how to dissect and operate in future.

2. Many parts, *i.e.*, perineum, &c. &c., require a considerable knowledge of Anatomy to enable a student to exhibit them.
3. The lecturer should exhibit good dissections, as an example for students to follow.
4. The lecturer should exhibit sections of many parts, viz., brain, &c., which the student could not make without destroying other parts of importance.
5. He should show sections of bones, &c., also parts at different ages of development, also minute inspections (*i.e.*, testes, &c. &c.) which the student cannot obtain.
6. The best plates should be exhibited and explained, and when defective, the defect explained.

7. Physiologieal experiments.
8. Mieroscopical speeimens, &c.
9. Diagrams and many other accessories cannot be obtained by students.

The student should only be required to attend the portion of each course on which he is to be examined for the session.

I believe an *annual* system of examinations essential to any good plan of education; when examinations take place after a term of years, the student puts off all study till the last session, and then resorts to the most destructive system of *cramming*.

The examiners should be twelve in number, and constitute a joint examining board for the kingdom.

Three examiners on Anatomy and Physiology.
„ „ on Chemistry, Materia Medica, and Pharmacy.
„ „ on Surgery.
„ „ on Medicine.

To satisfy nationalities, four should be chosen from each kingdom.

The four for each kingdom should be elected by the present licensing chartered universities and colleges, and all examinations should be conducted by them in the halls belonging to the said bodies.

The degrees and licences should be conferred by the several bodies as heretofore.

The examiners should be elected from the number of teachers of five years' standing, but should cease to teach.

The examiners should be very liberally remunerated, either by the crown or by a per centage on the several classes.

I believe that examinations, if conducted practically, by dissections, operations, and chemical analysis, made before the examiners, are the only means of ensuring *real* knowledge of Medicine and Surgery.

Dr. ANDREW BUCHANAN, *Glasgow.*

Report of Committee appointed by the Senate of the University of Glasgow to consider a Grant of Money for Practical Assistant to Professor of Physiology.

The Committee appointed to consider the grant of money for Practical Assistant to Professor of Physiology met this day—*Present*, Professor Rainy, Sir William Thomson, Dr. Gairdner, and Dr. Buchanan.

They agreed to report as follows:—

1*st*. That Physiology, as it ought to be taught at the present day, is an experimental science, resting, on the one hand, upon Physics and Chemistry, and on the other upon Histology and Descriptive Anatomy.

2*nd*. That without being taught to use the microscope, and being made familiar with the chemical tests and physical properties of the various objects which Physiology embraces, the medical student is deficient in some of the first elements of his education, and cannot, in consequence, derive full benefit from the instruction he may afterwards receive in the more advanced departments of medical study.

3*rd*. That good microscopes, and other delicate physical instruments, are required to teach Practical Physiology, as the Senate, indeed, have already recognized, by making two separate grants of money to the Professor of Physiology for the purchase of such instruments.

4*th*. That much time and care is required to keep the necessary instruments and apparatus in good working order, to prepare delicate objects for demonstration with the microscope, and to make the requisite arrangements for illustrative experiments.

5*th*. That such duties cannot be satisfactorily performed without an assistant adequately remunerated; that such an assistant must be a man fully educated to understand the various experimental manipulations and the use of the instruments under his care, and that he must be, moreover, fully trustworthy to look after the property of the Senate.

6*th*. That the University of Edinburgh grant every year £100 to the Professor of Physiology; and the Committee consider that sum as not more than commensurate with the important objects which have been stated above.

HARRY RAINY.
WILLIAM THOMSON.
W. T. GAIRDNER.
A. BUCHANAN.

Dr. G. BUCHANAN, *Glasgow*.

With reference to your queries I have to state: 1st. That no *one* plan can be most suitable for all persons and all places.—Each school or hospital will always have some speciality.—No great strictness can be enjoined in the manner of teaching.

Anatomy and Physiology should come early in the curriculum—but as Physiology implies a previous knowledge of Anatomy and Chemistry it should not come before the *second winter*.

Anatomy should be studied for the first *two* years imperatively, and some means—either by *regulations* or examination—should be taken to induce or compel the student to dissect during a part of his third or fourth year.

The shortest way to convey my idea of how Anatomy may be profitably learned is to sketch my plan of teaching it,—which I have found very suitable and successful.

First Winter.—Junior students sit two hours per day in the Anatomical reading room, during the first three months of the session. They get bones and dry preparations, and are compelled to master the *details* of Osteology before being advanced; they are assisted by myself and monitors the last three months; they occupy the same time per day in dissecting.

During the six months they attend demonstrations two hours daily, thus:—One hour, physiological views of the bones, going over the whole skeleton; second part of same—the nervous system. The second hour comprises descriptions of the regions,—also the muscles, vessels, &c.—Surgical Anatomy.

Summer Session.—Three months.—Two hours' dissection per day. Also, —one hour per day,—Demonstration of the Anatomy, Physiology, and often Surgery of the Genito-Urinary Organs (which are only touched on in winter).

Second Winter.—Dissection two hours per day, and repetition of the course of demonstrations. The second year students being examined orally on the Regional Anatomy principally.

Throughout both years systematic oral examinations are held one day weekly, besides the more familiar examinations in the dissecting room and reading room.

The examinations before the Colleges might well continue, as at present, to be held at the end of the second year, in Anatomy, Physiology, and Chemistry; but this division of examinations has a tendency to induce the student to neglect dissection afterwards, and some means should be adopted to enforce the students *continuing* the study of Regional and Surgical Anatomy by dissection, or being present at demonstrations, as it is undoubted then from the date of a student's licence and practice,—his practical knowledge will increase daily,—but this knowledge of Practical Anatomy will daily diminish in the vast majority of instances.

With regard to the *manner* of teaching Anatomy, no doubt tutorial or private study is very necessary, but the plan by lecture or demonstration seems to save time to the student, and to be essential as a guide. I do not think the public lecture could be avoided or even diminished in frequency.

I wish to add a few lines to the formal reply to queries sent to you as convener of Committee of General Council on the mode, &c., of medical study.

1. I am strongly of opinion that students of the *first year* should devote their first session almost, if not altogether, exclusively to study Anatomy and Chemistry. It is a waste of time for them to study Physiology till they have mastered the elements of Chemistry and Anatomy.

2. It should be an object to be kept in view, to endeavour to induce students of the third and fourth years to continue the *practice of dissection.*

My experience, as examiner, often leads me to be astonished how well advanced students will explain the *structure* of the kidney, liver, lung, &c., which few of them have prepared or even examined for themselves, describing from the pictures in books; while it is mortifying to find their ignorance or forgetfulness of things that can be seen and handled, and which knowledge is really of *use* to the surgeon and physician.

Take twelve candidates at random, and give an equal number of questions on structural and regional—especially visceral—Anatomy, and the truth of what I state will be remarked.

Dr. CLELAND, *Galway.*

In complying with the request of the Committee of the General Council of Medical Education, I find it convenient to deal first with the last of the three points mentioned in your circular.

3. "The manner in which Anatomy and Physiology can best be taught—by lectures, practical instruction, or otherwise."

Having had experience of the plan pursued in Scotland, according to which there is a course of Systematic Anatomy, a course of Demonstrations, and a course of Physiology or Institutes of Medicine, and also of the plan pursued in the Queen's Colleges in Ireland; according to which there is a course of demonstrations, so called, but including all Anatomy which may be learned from handling bones, or in the dissecting room, and a course of Anatomy and Physiology, in which all Microscopic Anatomy is taught as well as Physiology. I have no hesitation in considering the latter system the best, because in the former the student is most unnecessarily overlectured on subjects which very few students can listen to with profit for so long a period as an hour.

The Anatomical lectures ought not to be based exclusively on either the systematic or the topographic method. The muscles ought always to be taught elaborately in this course, and especial attention should be devoted to their action. The minute details of Osteology are best taught tutorially.

The joints, surgical anatomy, and the relations of viscera, are subjects which ought to be carefully treated of in every course of Anatomical lectures. But the distribution of subordinate branches of vessels, and a large amount of topographic Anatomy, may be safely left for the student to learn with the help of his own scalpel in the dissecting room.

It would probably be an advantage if the rules of the General Council and of examining bodies, relative to certificates, were such as to admit of the Anatomical course being divided into a certain number of senior, and a certain number of junior lectures each week, so that in his first year of attendance the student might miss what was beyond his comprehension, and in his last year might miss the topics with which he ought to be familiar; but I should deprecate any interference with the liberty of the lecturer in the division of his course.

The Physiological course ought to be illustrated with microscopes. In both courses examinations should be interspersed.

1. "The topics which may most advantageously be included under the subject of Anatomy and Physiology."

So far as the delivery of lectures is concerned, this subject may be left very much to the discretion of teachers, but for examination boards a rule may be sometimes necessary.

If only one set of Anatomical lectures and one set of Physiological lectures be recognized, as I have above recommended, then the Anatomical examinations should include, besides systematic and topographic Anatomy, the action of joints and muscles, and all questions relating to the postures of the body and its parts, and to progression; while the Physiological examination should include, besides Physiology proper, General Anatomy, Microscopic Anatomy, and all Anatomy which cannot be conveniently displayed in the human subject by the student in the dissecting room, and also Development so far as it may be desirable to examine on it.

2. "The period in a four years' course when Anatomy and Physiology can be most profitably studied, and the length of time which should be devoted to them."

It is impossible to give an opinion on this subject without referring to the whole curriculum of medical study.

The difficulty in arranging the curriculum does not arise so much from any of the ten subjects mentioned in the circular as in providing for preliminary education and an elementary knowledge of Natural History and Physics.

While quite agreeing with those who consider that Botany and Zoology are subjects which, when introduced into the middle of a medical curriculum, are more liable to distract and annoy the student than to improve him, I yet think an elementary knowledge of these subjects most important,—far more so than a smattering of Latin or Greek,—and I regard it as a very great assistance to the student in learning Anatomy, Physiology, and Materia

Medica. I therefore venture to lay before you as a suggestion the following plan :—

First Year.	Examination in Chemistry, Physics, and Botany.	Second Year.	Three Months' Practical Pharmacy in Summer.	Third Year.	Three Months' Practical Pharmacy in Summer.	Fourth Year.
Chemistry.		Anatomy.		Anatomy.		Dissection.
Physics.		Dissection.		Dissection.		Physiology.
Botany.		Physiology.		Surgery.		Midwifery.
Geology.		Materia Medica.		Medicine.		Forensic Medicine.
		Clinical Instruction.		Clinical Instruction.		Clinical Instruction.

I fancy that some plan of this sort would both educate the student better, and make his examinations easier than at present.

Dr. J. H. CORBETT, *Cork.*

I have the honour to acknowledge the receipt of your letter, and in answer I beg to state, according to my experience, the subjects of Anatomy, General Anatomy, and Physiology may be most profitably taught by two courses, viz :—

One course (Anatomy and Physiology) of six months, embracing the general anatomy of the tissues, the composition of the fluids and solids of the body, the anatomy of the viscera, and the functions of circulation, respiration, digestion, absorption ; office performed by the spinal cord and by spinal and cerebral nerves, anatomy and physiology of the organs of the senses, &c.

NOTE.—The subjects which may perhaps be left in great measure to reading by students are those relating to Cerebral Physiology and Generation.

The other course (Demonstrative and Descriptive Anatomy), comprehending anatomy of bones, joints, muscles, principal vessels, and nerves ; also Regional and Surgical Anatomy—this course to be accompanied by dissections performed by every student.

The course of Anatomy and Physiology may be most profitably attended during the first and second Winter Sessions. Students who exhibit fair proficiency in these subjects may be exempted from further attendance. On the other hand, students deficient in knowledge of the subjects treated of in this course should be required to attend at least a third course.

Descriptive Anatomy.—I am of opinion that students may be only required to attend lectures on Descriptive Anatomy during two Winter Sessions of six months each, and that such courses can be pursued with most

advantage to anatomical and general medical education during the first and second years of the course of study. But all experience has convinced me that two winters at dissections are inadequate for acquisition of a knowledge of Practical Anatomy, or for laying a proper foundation for the practice of Surgery.

I am strongly of opinion that students should be required to dissect during the third and fourth years, but not be obliged to attend lectures on Descriptive Anatomy beyond the two Winter Sessions already referred to.

The courses of Anatomy and Physiology to be illustrated by fresh and prepared dissections, by anatomical preparations, plates, &c.; examples of the various textures under microscopes, &c. I believe it of considerable advantage that teachers should hold weekly examinations upon the subjects treated of in the courses of lectures.

G. ELLIS, Esq., *London.*

My opinion on an efficient way of teaching Anatomy will be best conveyed to you by describing the plan that has been followed during many years in University College, London. As I have not any experience in the teaching of Physiology, I shall confine my remarks to the subject of Anatomy; and as your inquiry (according to the printed circular I received) is not intended to embrace the fuller courses of study suited for the higher professional qualifications, I shall refer only to the teaching of the Anatomical Class in general.

Period.—Anatomy is studied during two winter terms of six months each —viz., from the 1st of October to the end of March. The first two winters of the students' time are engaged in the learning of Anatomy, in order that the examination of the Royal College of Surgeons may be passed.

Instruction.—The student attends five days in the week a lecture of an hour's duration, and on the sixth day there is an oral examination of an hour on the topics of the lectures during the week. The examination is voluntary, and is attended only by a small proportion of the students.

Dissection from three to four hours follows the lecture daily. In this part of their study the students are catechised on their dissected parts by myself and the demonstrators.

Towards the end of the second winter term the students are further practised in written examinations, which are held one day weekly. The demonstrators conduct this part of the work by correcting the written answers, and returning them to the students for observation and study.

In everything that is done the teachers constantly endeavour to impart a knowledge of things, in opposition to a knowledge of words.

Dr. HANDYSIDE, *Edinburgh.*

In reply to the inquiries put to me by your Committee, under the subject of Anatomy and Physiology, I have the honour to observe :

Firstly.—That having regard to the course of study necessary to enable students to obtain the requisite knowledge and skill for the efficient practice of their profession, each of the four years of study ought, in my opinion, to extend over a period of nine months, from May 1st till July 31st ; and from October 1st till March 31st.

Secondly.—That Anatomy—embracing as its topics the bones, joints, muscles, the organs of respiration, the heart, the assimilative organs, urinary organs, generative organs, the organs of lactation, the vascular ramifications, the sympathetic system, the cerebro-spinal system, and the organs of the senses—may be most profitably studied in a three-fold manner, for at least the subjoined length of time, and at the following fixed periods :—

(1.) By four courses, amounting to 21 months, of Dissection, including that of the entire body, once at least ; with practical instruction throughout the day from 9 a.m. till 4 p.m., by the lecturer in person.

(2.) By three courses, amounting to 240 demonstrations of Regional Anatomy, of one hour each ; during which the various structures and organs of the body in their relative position to each other should be displayed, after which they ought to be viewed in their practical relations to Medicine and Surgery.

(3.) By one course of 100 lectures on Systematic (including General) Anatomy ; with tutorial classes for Elementary Anatomy, and for the practice and applications of the microscope in recognizing the structure and stages of development of the several tissues of the body.

SCHEME.

Years.	Sessions.	Dissections.	Anatomical Demonstrations.	Lectures on Anatomy.	Lectures on Physiology.
First	Summer	Three months	Three months	...	...
	Winter	Six months	Six months	Six months	...
Second	Summer	...	...	...	...
	Winter	Six months	...	...	Six months
Third	Summer	...	...	...	...
	Winter	...	Six months	...	...
Fourth	Summer	...	...	...	...
	Winter	Six months	...	...	...

Thirdly.—That Physiology, as a separate subject, ought not to be studied previous to, or in conjunction with, a first course of lectures on Systematic Anatomy. Systematic Physiology should be studied, and can best be taught during the *second* Winter Session; as seen in "scheme."

Fourthly.—That, in justice to the claims of Anatomy and Physiology upon the time of the student, the claims also of the remaining subjects of study, and the relative bearings of all, it seems essential to adopt a fixed "scheme," regulating the proper period and length of time—(on the plan, perhaps, above given)—which should be devoted to these several subjects. Such might prove of advantage to both teachers and students, and might obviate many mistakes into which the latter are too prone to fall; such as, in attending lectures on Physiology, Midwifery, Clinical Surgery, and Practical Midwifery, Practical Pharmacy, &c., before making any progress in Dissection.

Fifthly.—That, in answer to the question, "How ought the Examinations, on the various subjects of Medical Education, to be arranged?"

(1.) The Universities' and Royal Colleges' examining boards, at the close of every Winter Session, ought in my opinion, to submit each first-year, second, third, and fourth-year student, who may produce a certificate of regular attendance at his lectures and practical instruction, to a very short written and oral examination; on passing which, he should be allowed to inscribe his name in a register to be kept for the purpose.

(2.) No student should be admitted to examination at the close of a second year, a third, or a fourth year, who shall not have signed the register as a first-year, a second, and a third-year student respectively.

(3.) After a student shall have gone through, in succession, his four inscriptions, he should be entitled to present himself for a single cumulative written and oral examination—once for all—for his degree or licence upon the various subjects of Medical Education, to the study of which he would have devoted himself steadily, in all probability, during the period of four years. This system, if adopted, might be expected to put an end to the prevailing custom, among students of late years, of "getting up," for a mere temporary purpose, certain special subjects of study. And, incidentally, another advantage would obviously be secured; for then, on very tangible grounds, a greater regularity of attendance at the various courses of lectures and practical instruction would be gained.

(4.) Under this *fifth* head, I should feel ready to enter fully, if required, into an explanation of my views; and give the special reasons that seem to justify me in urging upon the Committee of the General Council a return in one important respect to the old system of conducting the examination of candidates for academical degrees and collegiate licences.

Dr. GEORGE HARLEY, *London.*

In reply to your questions regarding my views on the best mode of studying Physiology, I beg to say:—

1*st.* That twelve months ought to be devoted to it. Six months in the second year, and six months in the third year.

2*nd.* The first six months' course might be the ordinary one of lectures with class illustrations.

3*rd.* The second six months to be divided into two parts: one of two months to be devoted to Practical Histology, in which each student prepares and examines the objects for himself, under the eye of his teacher; one of four months of Practical Physiology, when the teacher demonstrates by experiment on the animal body the various functions, with the nature of which the student has already been made acquainted in the first six months' course.

N.B.—As living animals must here be occasionally made use of, I deem it inadvisable that the students take part in the experiments. They ought only to be onlookers.

4*th.* Each six months' course should be conducted by a special teacher.

Messrs. LUTHER HOLDEN and G. W. CALLENDER,

St. Bartholomew's Hospital, London.

In reply to your communications respecting Medical Education, you must allow us to take exception to the statement in your second letter that "the matter is one of great and urgent importance."

If we are only left alone, and not troubled with incessant agitation, we can manage, as we now manage, to educate medical students under the existing system as well as under any practicable modification of it.

Virtually we have been trusted by our colleagues with the management of this school for the last twelve years, and, speaking from a long experience, we are of opinion that the present system of education works exceedingly well. It allows, wisely we think, of a certain latitude as regards clinical teaching in the wards and in the out-patients' rooms; it provides for such instruction by means of lectures and of demonstrations as suffices to prepare the average student for the practical handling of disease and injury; if it fails it is through no fault of the system, but through want of energy and of zeal on the part of the teachers.

And we beg leave to draw attention to this fact—that any credit which

attaches to St. Bartholomew's as a School of Medicine and of Surgery is due, not so much to the celebrity of the senior members of the staff, as to the work which is done amongst the students by the younger teachers, who are stimulated by past example, and by the prospect of promotion, to devote themselves—we use the word advisedly—to the every-day duties of the school, which have always been their first, indeed, their only consideration.

In reply to your three questions we beg leave to state—

1. We see no reason to interfere with existing arrangements respecting Anatomy and Physiology.

2. Such subjects should be studied, as at present, during the first and second Winter Sessions.

3. They should be taught by lectures, by practical demonstrations, and by examinations, as now conducted in our school under the existing regulations,—a certain latitude in details being left, as now, to the discretion of the teacher.

We have to offer these further observations.

4. Materia Medica, Chemistry, and Practical Pharmacy should be taught during the first Summer Session, *before* the student commences his first Winter Session. This arrangement, which we have always recommended to our pupils, is permitted by the existing curriculum.

5. We agree with Mr. Paget in his suggestions (*a*) that attendance on one clinical lecture in each week is sufficient, and (*b*) that demonstrations of operatic Surgery and of minor Surgery should supplement the course of lectures on Surgery, just as practical demonstrations supplement those on Surgical Anatomy.

Dr. G. M. HUMPHRY, *Cambridge.*

I will reply briefly to each of the three questions proposed :—

1. The knowledge of Anatomy and Physiology requisite for the efficient practice of the medical profession need not extend beyond a knowledge of the structure and functions of the several parts of the human body, and of the relation of those parts to one another, it being understood that this includes a knowledge of the minute structure and chemical composition, and to some extent, of the chemical processes of the body, which is essential to an appreciation of morbid changes and processes, and to the adaptation of means of treatment. A brief sketch of the animal kingdom, showing the disposition of the several organs in the different divisions, especially in vertebrates, should, however, form an introduction to the study of Human

Anatomy, because it would enable the pupil to obtain a clearer and more comprehensive idea of the human body, and would throw greater interest over its study. Two or three lectures would suffice for this.

2. The first two Winter Sessions appear to be the best time for the purpose, and are usually sufficient for the acquisition of a fair knowledge of Practical and General Anatomy and Physiology. It would, however, be well for most pupils to continue the study of Physiology during a part, at least, of the third winter, or during the second summer. Some discretion as to the time required, in each instance, might be left to the teacher. (I suppose that Chemistry would be studied during the first winter and summer. Some knowledge of it should precede the study of Physiology.)

3. Anatomy and Physiology are, I think, best taught by a judicious combination of practical instruction, with lectures and frequent examinations, *viva voce* and written.

The study of Anatomy and Physiology affords an admirable opportunity for the cultivation of the habits of accurate observation and of reflection. It is, therefore, an excellent preparation for the medical profession irrespective of its direct relation to it, and this opportunity for improving the mental quality of the pupil should never be lost sight of by the teacher, who should make a point of encouraging the pupil not merely to learn the facts, but to think why the facts are so. He should also strive to make his teaching interesting, which is easily done by associating something of interest—teleological, practical, or other—with each fact taught. In short, he should endeavour not simply to teach Anatomy and Physiology, but to teach them in such a way as to inspire his pupils with a fondness for them and for other studies, and to prepare them to be accurate and thoughtful medical men.

Oral instruction affords the best means of doing this; and it should be carried on in connection with, and as a guide to, the pupil's private work.

The plan which I have followed for many years and found to answer exceedingly well (in Osteology and other parts of Practical Anatomy more particularly) is to announce at each lecture the subject of the succeeding lecture, so that the pupils may prepare it with their books and other aids; and then, at lecture, I question them upon it, asking the reasons for the facts as well as questioning them on the facts, and I add such further information as may be likely to instruct or interest them. In the more formal lectures I invariably occupy the first ten minutes of the hour in questioning on the subject of the preceding lecture. I, in addition, give, about every second week, written questions to be answered on paper.

All pains should be taken to mitigate or prevent any deterioration of character, or any disadvantage in the estimation of other men, which is likely to result from the work in the dissecting-room, by maintaining good order, cleanliness, and good ventilation. I trust it will soon be possible

and easy to prevent entirely the decomposition of bodies during the period required for their dissection. I think it worth while to mention these points because, there is no doubt, the features of the dissecting-room tend to cast some shadow over the profession, and prevent many from entering it whose names we should be glad to see in its lists.

Dr. E. LEDWICH, *Dublin.*

In reply to your circular the only suggestion I would presume to offer is to abolish all lectures, in schools I mean, and to make the ultimate examination the true test of a man's capability. Lectures in the present day, where books can be had on every subject, is simply robbery of the parent through the child, and on these grounds should be abandoned altogether.

Dr. E. D. MAPOTHER, *Dublin.*

In accordance with your request, I beg leave to express my opinion on—

1. "The topics which may be most advantageously included under the subjects of Anatomy and Physiology."
2. "The period in a four years' course when they can be most profitably studied, and the length of time which should be devoted to them."
3. "The manner in which they can be best taught—by lectures, practical instruction, or otherwise."

I think I can most profitably do so, although it may appear egotistical, by stating the course I have myself pursued for some years.

From the last Monday in October to the second Monday in November I lecture on Comparative Anatomy, taking different groups each year, say Mammalia one year, Birds the next, and Reptiles and Fishes the third. I illustrate the lectures by specimens from our great museum at the College of Surgeons, by dissections of animals dying at the Zoological Gardens, and plates. As specimens are occasionally obtained from the Gardens, or from fishermen, through the session, I dissect them and lecture on them.

For the next four months I lecture five days weekly on the subjects usually included in a physiological course (following the order of my manual). For the first ten minutes I examine orally on the subjects of last day's lecture. I begin a new subject by a brief anatomical description of the organ engaged, and by handing round specimens in microscopes, the pupils not leaving their

seats. I devote twelve lectures to Physiological Chemistry, showing the tests for the more common organic bodies. The last ten lectures are devoted to General Pathology, especially those subjects which can be illustrated by chemical tests or the microscope. Our students take three courses of Anatomy and Physiology, the courses for the first and second years being slightly varied, but the third years' men work with me for two hours each Saturday at tests, microscopical work, and dissection of lower animals. At the end of the session the first, second, and third years' men are examined by demonstration, in writing and *vivâ voce*, and prizes are awarded.

With regard to Anatomy, three sessions are devoted to it, the pupil attending each day an anatomical lecture, and dissecting about two hours daily, half the body being gone over each session. I feel strongly that every pupil should have the opportunity of performing a full course of operations on the dead body.

As the Committee request remarks on any other topic connected with Medical Education, I take the liberty of stating briefly what I have dwelt on at some length in my "Carmichael Essay," viz., that it is most desirable to reduce the number of educational and licensing bodies. This might be done by converting all the medical corporations into teaching institutions like the universities. The unchartered schools would probably be discontinued, for they could not compete with the chartered bodies which possess such great museums and libraries. I would render it imperative on all students to pass an examination before examiners appointed by the Medical Council who should occasionally sit in the three capitals of the kingdom. The universities should give to any who had passed the stated examination the degree of M.D., and the Colleges of Physicians and Surgeons the grade of Fellowship, but all practitioners should enter the profession by the one portal—namely, the examination directed by your Council.

Dr. ROBERT McDONNELL, F.R.S., *Dublin.*

I beg leave to forward the following reply to your letter (enclosed) of August, 1868.

1*st.* Under the subject of "Anatomy and Physiology" should be included Histology, Structural or Minute Anatomy, and Anatomy as it relates to the functions of organs; also Physiology as comprised in the ordinary handbooks on that subject. N.B.—A separate course of "Descriptive Anatomy" is given in all Irish schools.

2*nd.* During the first two years of a four years' course.

3*rd.* By "Practical Instruction"—that is, by exhibition of specimens, by

demonstration whenever the subject can be demonstrated, by models, diagrams, exhibition of instruments used in divers experiments, by experiment, and by frequent class examinations.

In considering "how the various subjects may be taught with most advantage" it appears to me that everything turns upon the examinations, and the mode in which they are arranged. When examinations are ill arranged and defective, education must be so likewise. Teachers and pupils must and will at once adapt themselves to the requirements of the examinations. I should be in favour of three examinations, one at the end of the second year, one at the end of the third, and the last at the end of the fourth.

The first examination should deal for the most part with elementary scientific subjects and general principles. The later examinations should relate to matters of practice: all should be conducted in the most practical manner possible.

Teachers should be allowed to teach, and pupils should be allowed to learn, each after their own fashion. Provided the student has acquired the knowledge necessary to pass a sound and thorough examination, I should not require him to follow any prescribed course other than may be needed for the examinations.

My experience as a teacher (now extending over many years) induces me to believe that it is entirely to our examinations that we must look for improvement in Medical Education. If the Medical Council takes care of the examinations, the education will take care of itself.

Dr. T. CARGILL NESHAM, *Newcastle-upon-Tyne.*

In reply to your circular, I beg to give you the following returns:—

Question 1.—(*a.*) The study of the Anatomy of the human frame as it may be found described in any of the text-books on Anatomy—such as "Quain and Sharpey's Anatomy"—"Ellis's Demonstrations"—"Holden's Manual of Dissection," &c.

(*b.*) The study of the functions of the various organs of the human body, with a slight explanation of their Animal Chemistry; leaving the more detailed description of this division to the lecturer on Chemistry.

Question 2.—The first and second Winter Sessions.

The whole time of these two six months' courses, which is not occupied by the study of Chemistry and attendance on lectures (in the first session) on Physiology, and the further application of Physiology (in the second Winter Session), viz., experiments and the use of the microscope in Histological Anatomy.

Question 3.—Three lectures a week on Anatomy, of one hour each ; one examination a week on the three lectures.

Practical demonstration in the dissecting room, every day, from 10 A.M. to 4 P.M. And for the last three months of each session a tutorial class (optional) twice or thrice a week, of one hour's duration.

My view of the first two Winter Sessions of a student's curriculum is, that they should be devoted to the study of Chemistry, Physiology, and Anatomy, and that his hospital course should not commence until the second Summer Session.

T. W. NUNN, Esq., *London.*

In reply to your circular inviting opinions on the subject of Medical Education, addressed to teachers, I have the honour to communicate the following :—

I assume the object of the Committee is to provide a scheme of education that shall secure to a variety of capacities a uniform or average amount of information on certain given topics.

Anatomy, General Anatomy, Physiology, and Chemistry are of primary and fundamental necessity, whilst the recognition of disease is the aim and purpose of all these studies.

The recognition of disease can only be acquired by clinical observation—the nature and history of disease by systematic teaching in Surgery, Medicine, and Midwifery, keeping the declared object of the committee in view. I submit that Forensic Medicine and Materia Medica are subjects properly belonging to the extended course of study designed for the higher walks of the profession. The present duration of each lecture—namely, one hour—is beyond the limit that students can maintain a fixed attention ; anything short of fixed and earnest attention is obviously worse than useless.

It is hardly to be expected that students can connect the part of an argument or the statement of bald facts, uttered in October, with the conclusion announced in March ; I therefore humbly beg to express my opinion that the courses are at least twice too long at present.

The natural and instinctive mode of communication of ideas is by means of speech ; man has invented a method of perpetuation of ideas by writing. Speech is for the enumeration of ideas ; writing for their registration, or to effect the recording of ideas.

It would be illogical to abolish lectures, whilst, at the same time, ideas announced could not be retained, except by very few, without the opportunity of reference to a record of such ideas, either in a class-book or in notes of lectures.

Clinical observation ought to be commenced on, and should be continued from, the first day of studentship; and if Anatomy and Physiology be especially studied during the two first years, Pathological Anatomy should be equally and as completely insisted on during the remaining two years of study. If the primary examination be chiefly in Anatomy and Physiology, Nosology should also be included.

Having been engaged in teaching during twenty-two years, I have found that the difficulty of apprehension of ideas varies almost with each pupil. It is therefore, in my opinion, of the greatest importance that tutorial teaching should be largely provided for.

Dr. PAVY, *London.*

Subjoined is what I have to state in answer to the inquiries addressed to me from the office of the General Council of Medical Education.

Question 1.

Physiology proper, with a general anatomical description of the various organs and textures, including their minute anatomy and development. The functions of a part cannot, I conceive, be advantageously studied without an acquaintance with its anatomical construction. (Descriptive Anatomy, I take it, is not intended to be included under the head of "Anatomy and Physiology"—at all events, I am of opinion that it ought to be considered as a subject apart.)

Question 2.

General Anatomy and Physiology should, unquestionably in my opinion, come at the beginning of the course, as it forms the basis upon which a knowledge of disease should be built up. I am inclined to think that it could most profitably be studied during the second Winter Session—that is presuming that Anatomy is studied during the first and second, and that Medicine and Surgery are studied afterwards.

Question 3.

By illustrative lectures and microscopic demonstrations. The term illustrative, I mean, should include physical and chemico-physiological experiments and likewise such experiments—and there are many upon living animals—as are admissible. I feel strongly that Physiology is becoming more and more a subject admitting of experimental illustrations in teaching, and that a much sounder knowledge is to be given by the introduction of experiments than without them.

Dr. REDFERN, *Belfast.*

In reply to your letter of the 5th August, 1868, it is my opinion—

1*st.* That the subject of Anatomy and Physiology may most conveniently be divided into—(*a*), General Anatomy, or Anatomy of textures, and the Anatomy of the viscera, taught with their Physiology *in one course;* and (*b*), Descriptive Anatomy (that of bones, articulations, muscles, and the larger vessels and nerves) and dissections, taught in another course.

The topics included under the term Anatomy and Physiology should be such, for example, as are included in the General Anatomy in the last edition of "Quain's Anatomy," and in "Kirkes's Physiology," with the Anatomy of the viscera in addition.

2*nd.* The course of Anatomy and Physiology should be attended during the first, second, and third, or first, second, and fourth years; not so much for the purpose of exacting rigorous daily attendance the third time as to give the student an opportunity of learning thoroughly any subjects or parts of subjects with which he may not have become familiar.

The course of dissections should be so arranged as to allow of each student dissecting during the whole of his four years without great expense. Thus he would be able to dissect during all his spare time, and acquire a sound and lasting knowledge of the human body, very superior to that which can possibly be gained during two winters spent in dissecting a longer time each day. The course of Descriptive Anatomy should be required to be attended sedulously during the first two winters, and the student should be permitted to attend any part of the course during either of his subsequent years.

3*rd.* Anatomy and Physiology should be taught by lectures, illustrated by fresh and museum preparations, and specimens of the textines exhibited under microscopes.

Descriptive Anatomy should be taught by lectures, and by actual demonstrations in the dissecting room; but it is of the greatest importance that dissecting rooms should not be left to demonstrators, however numerous. Strict discipline, quietude, and steady work can only be secured by the presence of an earnest professor, or some one possessing equal interest in the work and authority over students.

Botany and Practical Chemistry should be added to the ten subjects; and Botany, Practical Chemistry, Practical Pharmacy, Forensic Medicine, and either Midwifery or Materia Medica should be taught during the Summer Sessions.

The course of Midwifery might be divided into one summer course of Midwifery proper, and a second of diseases of women and children.

The courses of Surgery and Medicine should both be attended twice.

As to examinations, I have no hesitation in stating my opinion that the

State should institute and maintain *a single* Examining Board to grant a mere licence to practise, and the universities and colleges might be left alone to grant diplomas, which would soon find their own level.

It would be a great step in advance if every student were required to satisfy his teachers that he had done a fair amount of work on the subjects of one year before he was allowed to enter on the subjects of the next year.

Dr. B. WILLS RICHARDSON, *Dublin.*

Suggestions respecting the Studies and Examinations of Medical Students:

1. That each gentleman proposing to study for the medical profession, shall previously pass the entrance examination of a university, recognized by the State. But, should any proposing student present a pass entrance certificate of a recognized university, in which the English language does not form part of the entrance curriculum, then such gentleman shall be required to pass an examination in English Grammar and Writing from dictation, in whatever licensing institution he intends to register.

2. That there shall be periodical examinations in Anatomy, Physiology, Medicine and Surgery, like in system to the periodical examinations of universities. The student would thereby have to commence the studying of the practical duties of the profession, from the period of his registration. As it must be conceded that he should have some knowledge of our literature, this could be insured by the Licensing Bodies establishing a college course, composed of standard medical, surgical, and physiological works, out of which students should only be questioned. The earlier their standing, the more rudimentary the books should be.

3. In order to carry out the above suggestions, and, at the same time, insure practical study, the examinations ought to be held either at the end of each session, or of each student year, or of both. The first examination to be practical; the second, literary, thus :—

FIRST YEAR. *April Practical Examination, demonstrative by the Student.*	*Anatomy.* The bones, excluding those of head, hand, and foot. *Surgery.* Dressing, bandaging, and splints.
FIRST YEAR. *September Literary Examination.*	*Medicine, Surgery, and Physiology.* A standard work on the rudiments of Medicine. „ „ „ „ of Surgery. „ „ „ „ of Physiology of bone and blood.

SECOND YEAR. *April Practical Examination, demonstrative by the Student.*	*Anatomy.* The bones of head, hand, and foot. *Surgery.* Minor operations.
SECOND YEAR. *September Literary Examination.*	*Medicine, Surgery, and Physiology.* Part of a standard work on Medicine. „ „ „ on Surgery. „ „ „ on Materia Medica. Physiology of absorption and digestion.
THIRD YEAR. *April Practical Examination, demonstrative by the Student.*	*Anatomy.* Arteries, and their relative anatomy. Deligation of Arteries. „ of Drugs.
THIRD YEAR. *September Literary Examination.*	*Medicine, Surgery, &c.* A standard work on Medicine. „ „ on Surgery. „ „ on Medical Jurisprudence. „ „ on Materia Medica. „ „ on Physiology.
FOURTH YEAR. *April Practical Examination, demonstrative by the Student.*	*Anatomy and Operative Surgery.* Nervous system. Contents of thorax and abdomen. Generative organs of male and female. Operative Surgery.
FOURTH YEAR. *September Literary Examination.*	*Medicine, Surgery, &c.* A special work on some important Medical subject. A special work on some important Surgical subject. A work on diseases and surgery of the eye.

4. After all the examinations have been successfully passed by the student he becomes thereby entitled to his degree.

5. An examination must be successfully passed before the student can be permitted to enter his name for a subsequent examination.

6. With respect to Question 3, of the Committee, I think that Practical Anatomy and Physiology should be, as far as possible, taught demon-

stratively ; and, therefore, I would confine the study of those subjects to the dissecting room and experimental theatre.

Although the Committee have not included Medicine and Surgery in their questions, I have taken the liberty of doing so, as the Committee state in the third paragraph of their circular, that the inquiry "is restricted to the course of study which is necessary to enable students to obtain the requisite knowledge and skill for the efficient practice of their profession."

Dr. G. ROLLESTON, *Oxford.*

Owing to very considerable press of engagements, I have postponed answering your questions, which, I must add, relate to questions which are not brought very forcibly before my attention in the peculiar sphere of my duties.

With regard to students who are not intending to qualify themselves for the highest branches of the profession of Medicine, and to the cases of which you request me to confine the answers I make, I have to say that even in this case no certificate of competency in Anatomy and Physiology should be given without their having shown practical acquaintance with the use of the microscope and with the employment of the ordinary chemical tests employed in physiological investigations.

In answer to your second question, I am very strongly of opinion that students should dissect for two Winter Sessions, during the second of which their practical work should have its surgical and medical bearings kept constantly before their eyes.

In answer to your third question, I should say that there are two classes of men—the idle and the diligent, the pass-man and the class-man, and that for these two classes two different lines of instruction and discipline are absolutely necessary. The idle man should be tied down to curricula, and kept constantly under the stimulus of impending examination; the class-man, or man who works for work's sake, should be given to understand that so long as he gives proof that he answers the description his name implies he will be left to work as his own judgment, aided by the advice of his teachers, may prompt him. Now examinations happen to be the only means we have (of a reliable kind, and of a kind superior to suspicion of corrupt favoritism, &c.), and hence they must be employed in the case of good as well as of indifferent men. And examinations by their rewards and punishments give a *natural*, as opposed to a naked, sanction and weight to the advice just spoken of by the teacher.

The plan of teaching I think best, combines (1) lectures ; (2) examinations

by private teachers—who ought never to be allowed to be public examiners of their own pupils; and (3) demonstrations in varying proportions. But examinations are essentially the measure of what all teaching and all learning, except in the exceptional cases of exceptionally good men, can be made; and I believe all real improvement must begin in the quarter of examinations. To this, however, I do not understand that you wish me to direct my reply, at least directly.

Dr. W. R. SANDERS, *Edinburgh*.

I have to submit the following answers to the queries in the circular of date August 4th last:—

1. "Topics most advantageously included under Anatomy and Physiology:"

Anatomy should include—1. Descriptive Anatomy, as usually given in systematic courses of lectures; and 2. Relative Anatomy, including Surgical and Medical Anatomy, as usually given in demonstrative lectures or "demonstrations" in Edinburgh.

Physiology should include—1. General, Physiological, or Minute Anatomy, or Histology; and 2. The special physiology or description of the functions of organs.

It would require some space to give a detailed syllabus of the topics under each of these heads, and it does not appear necessary to do so. In regard to Physiology, the course should, I think, be on the plan of Todd and Bowman's "Physiology and Physiological Anatomy," with certain parts—*e.g.*, development—curtailed.

Having stated what should be included, I may add what should be excluded:—

Anatomy ought not to include Comparative Anatomy, which belongs to Natural History, nor Morbid Anatomy, which belongs to Pathology.

Physiology ought not to include Pathology, which is a separate department; nor, for ordinary medical students, should Physiology include a knowledge of the experimental details of Animal Electricity, Optics, Acoustics, &c.

Transcendental Anatomy, or Morphology, and the higher departments of Physiology should be reserved for special courses, to be given to advanced students qualifying for special work in these branches.

2. "Period of study during a four years' course, and time allowed to each subject:"

Anatomy should be studied during the first and second years, six months each year—*i.e.*, during the first year systematic lectures and dissections,

with tutorial classes; and during the second year "demonstrations" with dissections, but without systematic lectures.

Physiology.—For six months during the second year there should be systematic lectures, with practical instruction in Histology and Physiological Chemistry.

3. "Manner in which subjects are best taught—by lectures, practical instruction, or otherwise:"

Anatomy requires, I think—1. Systematic lectures, say three or four days a week, with examination of the students once or twice a week; 2. Tutorial classes for beginners, for instruction about the bones and ligaments; 3. Dissection under experienced demonstrators, the student being examined frequently on his dissections—all this during the first year; the systematic lectures for six months, the tutorial class for one month or more, as requisite, and the dissections not less than two hours a day (when subjects can be had) during the whole session. During the second year, demonstrations for about six months, dissections as before, but the student should be called on to demonstrate his part from time to time.

Physiology, including General Anatomy, requires a six months' course, consisting of systematic lectures three or four times a week, and examinations once or twice; and, besides this, of practical instruction during two or three months, once or twice a week, in the use of the microscope and in Minute Anatomy and Physiological Chemistry. Students should be required from time to time to demonstrate tissues under the microscope.

When convenient, the practical class might be attended in summer, after the first winter session.

These departments of instruction should be under the direction of a professor or lecturer, who should be aided, when classes are large, by properly-qualified assistants and tutors. But all the work, the practical as well as the examinations, should be superintended by the professor or lecturer, who must be responsible for everything.

In what is said above it is assumed that there are separate teachers of Anatomy and Physiology, and this, I think, ought to be the case.

In addition to the above replies to the special queries of the circular, I would subjoin a few observations on other points deserving of attention, in connection with the subject of your Committee's inquiry.

1. In my opinion, all lectures and demonstrations and practical instruction should be given during the day—never in the evening. If it were possible, all lectures should cease by 2 or 3 P.M., so as to allow the student an interval before beginning his private studies in the evening, or to allow him to prosecute his own practical studies after 2 or 3 P.M.

2. In each subject of instruction there should be practical teaching, as well as systematic lectures. I do not think the former can be entirely substituted for the latter; but the amount of practical teaching or of lectures

must vary in different subjects, according to the time allotted to them, &c. Practical teaching necessarily requires longer time than lectures, and experience alone can settle what proportion of time can most profitably be spent in practical instruction or attendance on lectures. Undoubtedly, the practical instruction is required for all details, but I think systematic lectures are necessary to explain principles; and lectures in conjunction with, and arising out of, the practical work would, I think, be best.

However that may be, at medical schools a laboratory or room should be provided for the practical study of every separate subject. The room should be sufficiently large to accommodate the required number of students—not necessarily the whole class at once, but in subdivisions—and should contain all the requisite apparatus, and be under the constant superintendence of the teacher or his assistant. Already there is the dissecting room for Anatomy; so there should also be a dissecting room for Comparative Anatomy, &c., in conjunction with Natural History; a room for autopsies, and for dissecting and preserving morbid specimens in connection with Pathology;* a room for microscopes, &c., in connection with Physiology; a laboratory for Chemistry, and another for Materia Medica and Toxicology. The dispensaries and hospitals are the proper practical departments of Medicine and Surgery, but in hospitals there should be proper accommodation provided for chemical examination of urine, &c., with microscopes and other apparatus. In connection with Surgery, there should also be provision for performing operations on a dead body—probably one of the anatomical dissecting rooms might be used for the purpose.

3. Four years are too few for the full professional curriculum, as at present arranged. It would be bettter if, in addition to a preliminary school education in English, Latin, Mathematics, &c., there were also a scientific preliminary education in Natural Philosophy, Natural History, and Botany, with the elements of Chemistry—Natural History to include Zoology, with dissections by the student, of examples of the chief divisions of the animal kingdom.

4. The sessions might with advantage be divided into three terms—the first from the beginning of October to Christmas; the second, after the holidays, from January to the end of March; then, April being left for examinations, &c., the third term should last from the beginning of May to the end of July. Courses might then last one, two, or some even three terms; and the subject of instruction would require to be completed within the term allotted to it.

5. Examinations ought to be at least half practical in the laboratories,

* Pathology is not included specially as one of the ten subjects recommended by the Medical Council. I believe, however, that, in the present state of medical science, Pathology, including chiefly Morbid Anatomy, is an essential part of medical study. The superiority, in some respects, of the continental schools depends on the greater attention paid to this department.

hospitals, &c. In most subjects, and probably in all except the clinical examinations, a schedule or syllabus should be published, stating the chief topics deserving the student's attention, and to these topics the examination should be limited. This is already done in some quarters in regard to Chemistry, Botany, and Natural History. In Arts examinations the practice has long been to limit the number of authors read, &c.; and in France programmes are published of the heads—or even formerly the main questions —of ten different subjects for their preliminary "Baualauréat" of letters and of sciences. These programmes are, however, unnecessarily minute.

In conclusion, I have referred rather to a full than a minimum curriculum, because it appears to me necessary to raise the *kind* even more than to limit the amount of medical education. To insure good teaching it is essential to have good teachers, and this cannot be expected unless sufficient status and remuneration are held out as inducements to able men to take to teaching as a profession. That is a subject also involved in the inquiry before the Committee; but the other matters, in regard to the extent of the curriculum, must first be at least approximately settled.

WILLIAM S. SAVORY, Esq., F.R.S., *London.*

Before attempting to answer each particular question in your letter, it is only fair to state the general views I entertain upon the subject of your inquiry.

I should witness with much regret any further attempt to reduce the standard of scientific instruction which is already, in my humble opinion, too often below the mark. Let it be remembered that what students get at the hospital is the only regular course of scientific instruction the great majority of them are ever likely to receive. Whatever the standard may be, most students will probably fall short of it; therefore the lower it is depressed the worse for education in general.

The standard of scientific teaching should be kept up, in order that our pupils may enter upon the study of Medicine and Surgery most advantageously by being properly instructed at the outset in those principles and leading parts of natural science upon which the art and practice of Medicine and Surgery are founded. I suppose most men in practice, as they grow older, gradually drop first their scientific knowledge, then their acquaintance with medical and surgical literature, depending more and more upon their own experience in the practice of their art. However well this may be in the main, one evil result of it is that perhaps we are too apt to legislate for

the beginner from our present point of view, assuming that because we have forgotten much of what we once learnt, and get on very well without it, that therefore it has been useless. It appears to me that an opposite conclusion should be drawn from the fact.

Moreover, there is a general tendency, I think, to reduce the area of our work as we proceed—to settle down on narrower or more special lines of thought. On that account education should be, at the outset, as ample as possible.

One reply to this may be that these views would be all very well if there were time to carry them out. If this objection be valid, then I would meet it by extending the time of attendance at hospitals. Why not? Why should it be limited even to four years? Let us by all means have, if fewer, still better men. But I affirm that there is ample time even for more than the present amount of scientific teaching. As matters now go, in every school, the great majority of students waste much time.

I confess I am not able to appreciate the force of the argument which assumes that the time given to the study of the sciences must be taken from that which would otherwise be devoted to more practical pursuits. On the contrary, while there is time enough for both, the study of one is a relief and assistance to that of the other. No student is willing, or in my opinion able, with profit, to give the whole sum of his working hours to a single subject, and if there were no stronger or larger reason for the study of the natural sciences, I would submit that no other occupation can be found so well adapted to employ a portion of the time of each day during which the active study of Medicine and Surgery must be suspended.

At all events this much I will venture to affirm. Those students who profess to devote themselves exclusively to what are called the practical subjects are certainly not those who become best acquainted with them. The student who works hardest in the dissecting room and at lecture is almost invariably the most diligent and successful student in the wards.

Then for the particular questions. I would teach Anatomy and Physiology at least quite as fully as heretofore. It must, I imagine, be left to each teacher to choose the topics which may be most advantageously included under each subject. I cannot point out any particular topics which should be taught to the exclusion of others.

I suppose the best way of teaching Anatomy and Physiology to be—

By lectures, which should be made as demonstrative as possible, and illustrated in every way practicable, and by examinations.

By books carefully selected.

But, above all, by practical work—such as by dissection, the use of the microscope, &c.

These subjects, with Chemistry, should be taught at the commencement of the pupil's professional studies.

Indeed I have, with others, often thought that the teaching of these subjects, instead of being distributed amongst our several hospitals, might be much more beneficially carried on at some one or two central colleges. I believe that such a plan would afford advantages, resulting from a concentration of force which would far outweigh any objections to it. But upon this scheme I must not trouble you at length.

Then with reference to the same specific questions which you have asked me respecting Surgery and Clinical Surgery. I would say again, in reply to the first, that I do not know how to distinguish any topics in particular which may be most advantageously included under the subject. Or rather I would say that I could not approve of the exclusion of any that properly belong to the subject.

In reply to the third question I would teach them—

By systematic lectures, illustrated in every practicable way, and by examinations.

By books carefully selected, so as to avoid as much as possible the system of cramming or grinding.

But, above all, by clinical study in the strict acceptation of the term; by bedside work on the part of the student, guided and enlightened by clinical remarks from the teacher.

With regard to the second question, I would indicate briefly three periods of study.

The 1*st*—for one year—should be devoted to the study of Anatomy, Physiology, Chemistry, Botany, and Materia Medica.

The 2*nd*—for two years—to the continued study of Anatomy and Physiology, and to the study of Medicine, Surgery, and Midwifery by systematic lectures and work in the wards.

The 3*rd*—for two years—to the continued study of Medicine, Surgery, and Midwifery by clinical lectures and practical work in the wards.

Thus I would have the total period five years at least. If, however, it must be compressed into four years, I would propose one instead of two years for the second part.

In conclusion, I may be allowed to remark that an experience of seventeen years as a teacher at St. Bartholomew's Hospital and of five years as an examiner at the University of London, has led to the conviction that so much more depends on the teacher and pupil than upon the nature of the subject or the order in which it is taught, that, after all, comparatively very little good can be effected by any amount of legislation.

But examining boards, and not teachers in hospitals or elsewhere, must ever fix the standard of education in general. The great majority of students will produce a supply equal to, but not far beyond, the demands of those upon whom depends their legal right to practise.

Dr. JOHN STRUTHERS, *Aberdeen.*

Responding to your communication as Chairman of the Committee of the General Council of Medical Education, I have the honour to transmit to you my opinions on the subjects to which your inquiries relate. My reply is divided into two parts, according to the form of inquiry. 1. Relating to instruction in Anatomy and Physiology. 2. Further observations in connection with Medical Education.

PART I.—*Relating to Instruction in Anatomy and Physiology.*

1. "The topics which may most advantageously be included under the subject of Anatomy and Physiology."

Anatomy and Physiology should be taught in separate courses and by separate teachers. Although the two sciences are closely related, they are now so extensive that each is at least enough for the ability and time of one teacher, if they are to be well taught. It is not difficult to draw the line between the topics which each should include. The one relates to *structure* the other to *function.* Various divisions of the two subjects have been made to suit the circumstances of the school or the engagements of teachers, but the distinction of structure and function is the natural and simple one. The teacher of each must often cross the line, not, however, by way of formal teaching, but by reference. The teacher of Anatomy must often refer to function, not merely to adaptations of form, as in giving the bones, joints, muscles, &c., but to function, as in giving the parts of the vascular and nervous systems, the viscera, &c., so as to simplify the Anatomy. The teacher of Physiology, on the other hand, must often refer to structure, as the parts of the brain and cord, the arrangement of certain nerves, the structure of the viscera, the function of which he is discussing, the valves of the heart in giving its sounds, and so on. Formerly time was wasted in both of these classes by repetition, the teacher of Anatomy endeavouring to go into Physiology also, while the teacher of Physiology endeavoured again to go formally through General Anatomy, and in some schools even now, I understand, the teacher of Physiology gives also the descriptive Anatomy of the viscera—of those parts which concern the physician—while the teacher of Anatomy takes the parts which most concern the surgeon. It may be a convenient arrangement for the teacher of Anatomy who is occupied in surgical practice to be thus relieved of those parts of the course which most require the use of the microscope, and make demands on his time; that may be a matter of necessity in some, especially in the smaller schools, but it does not tend in the direction of thoroughness of anatomical teaching. In the Scotch universities there is the course of Anatomy, and the course of

Physiology, the latter known frequently by the ancient title of "Institutes of Medicine,"* and supposed to include more or less Pathology. The professors of Anatomy, on the other hand, are appointed for Anatomy, and, devoting themselves to Anatomy, teach it in all its branches. I may mention, for instance, that I hold my commission from the Crown as "Professor of Anatomy." The distinction in our universities, therefore, is not a matter of arrangement. I have observed a gradual approximation to this system on the part of other schools, and my opinion is that it is the best. Without general Anatomy and the use of the microscope, anatomical instruction would not only be deprived of much of its value and interest, but would hardly be worthy of the name.

Physiology proper is a very extensive subject, every day becoming of greater importance to practical medicine, and the teacher of it, by confining himself to his subject, is able to find time for experimental illustration, without which, now-a-days, a course of Physiology cannot be reckoned complete.

2. "The period in a four years' course when they can be most profitably studied, and the length of time which should be devoted to them."

The period when anatomical study is laid aside is practically regulated by the period of the pass examination in Anatomy. When we take into account not only the importance of Anatomy, from its nature and extent, but that the knowledge of it acquired by the student has generally to last him for life, as it is almost the only branch which the practitioner is unable to improve himself in, practically, after he has left the medical school, it is not too much to say that anatomical study should not be allowed to be thrown aside before the end of the third year. I am far from saying that further dissection may not be engaged in with advantage during the fourth year also, if the student can find time for it, for I would hesitate to appear to assign any arbitrary limit to the attention which the student should give to the dissection of the human body.

The study of Physiology should not begin before the student has some acquaintance with Anatomy and Chemistry. The pass examination in Physiology should be at the same time as the pass examination in Anatomy.

3. "The manner in which they can best be taught—by lectures, practical instruction, or otherwise."

In a well organized school of Anatomy, the teaching should be, in part to the assembled class, in part to small groups, and in part to individuals.

All lectures on Anatomy should be well illustrated by fresh dissections, by specimens and dissections from a good anatomical museum, by good diagrams; and sketches on the black board are often useful, if the lecturer can sketch. Besides, by the exhibition of the parts and their description,

* See my "Historical Sketch of the Edinburgh Anatomical School," p. 84, et seq.

the lecture is rendered doubly interesting and useful when the parts are also viewed; on the one hand, in their scientific aspect, and on the other hand, in their practical aspect in relation to Medicine and Surgery; that is, when both scientific and surgical Anatomy are combined, so as to render attractive, simple and impressive, what, when otherwise treated, have been, and with some truth might be, called the dry details of Anatomy.

To such a course, as guiding and stimulating the student, as well as giving instruction, it would not be easy to attach too high a value. Instruction of this kind can be delivered only in the theatre, and quite suitably to the assembled class. But if the anatomical lecture is to be only a demonstration, it would no doubt be better to have the class subdivided into groups (the tutorial method, in the sense of being to small classes), as the purpose of demonstration fails when the condition of seeing all the parts distinctly is unattainable. The most valuable form of demonstration, no doubt, is that to each individual over his dissection, but in addition to this there should be more formal demonstration to groups appropriately classified and sufficiently small to enable each to see the parts clearly. The practical objection to the tutorial (small group) system of demonstration is the demand on the teacher's time which it implies, and this will be most felt in large schools or where the teacher has other engagements.

A complete course of Anatomy cannot be given in the 100 lectures, or meetings, usually allotted. Fifty to sixty lectures additional would be needed. If we cannot go on the plan of making the best of the 100 lectures, by selecting what is most suitable for the lecture room, and trusting to dissection and tutorial instruction for the rest, these additional lectures might be given as a supplementary course, if time can be found. But a second formal lecture, as a daily system, is a thing to be avoided if possible; a supplementary tutorial system being preferable, reserving for it those parts to which this method is better suited. This can be done at hours when appropriately-arranged groups of the class can attend. The teacher who is present at his anatomical rooms during the day need have no difficulty in arranging these details.

The pupils should also be examined, systematically in connection with the course of lectures, and each demonstratively on the "part" which he is dissecting, and a record should be kept of the result according to a scale understood in the school.

But there need not be absolute uniformity in detail, even were it attainable, amid the various natural and accidental peculiarities of schools, and the various qualifications of teachers. My ideal, however, of an anatomical school system would be, a good guiding and stimulating course of lectures supplemented by tutorial teaching, accompanied by, and fitting into a practical course, in which there would be careful dissection and practical demonstration to individuals and to small groups; the whole accompanied

by regular examination, so as to asecrtain and insure progress. A matter of mueh greater importanee than laying down a detailed method of teaehing is to promote a systcm in the schools whieh will produce and rctain good teaehers. Sueh teaching as I have indieatcd can be only wherc, besides the demonstrator or demonstrators, therc is an anatomist making thc work of the school and the science of Anatomy his sole and ehief occupation ; who, besides giving the lectures, superintends the work of the practieal rooms, and sees that the two shall work into each other so as to form, between them, a complete system. There can be no thorough teaehing when the lecturer merely comes in for an hour or two from his praetiee, and is dcsirous of lcaving the leetureship on Anatomy for that on Medicine or Surgery as soon as he ean. It is of great value to the surgeon and physician to have had sueh training, but it is through the demonstratorship he should be so trainod ; the lecturcship or profcssorship of Anatomy should bc made worth rcmaining in, worth giving up Surgery or Medicine for, if Anatomy is to hold the placc in a school which its importanee dcmands. It is partly to these conditions having been to some extent attained in thcm that thc Scotch universities owc their position as anatomical schools.

Some of the schools appear to me to err in not having anatomical instruetion also in the Summer Session. Though disseetion is not so plcasant during the latter part of it, the student may, notwithstanding, thus considerably extend his acquaintance with Practical Anatomy. Practical demonstrations may also bc given, and occasional leetures on eertain parts of Anatomy, as Comparativc Anatomy, and more cspeeially on General Anatomy. It is a very suitable time to train the student to work with the microseope. Thcre should be a room fitted up for microscopical study, and provided with mieroscopes, in connection with every dissecting room, in whieh thc pupils eould work at any hour, as in the disseeting room ; and the teacher of Anatomy might give leetures and demonstrations on Histology (General Anatomy) once or twice a week, to guide the student systematically through the eourse. As the student has not much leisure for working with the microseope during the Winter Session, this eomes vcry appropriately in the summer. I have found this method to be attended with thc most satisfactory rcsults, not merely a few, but all thc students in my class being, in eonsequence, as familiar with minute Anatomy, and with the use of the microseope, as they are with the Anatomy of the dissecting room, and with the use of the sealpel and foreeps.

In regard to the teaehing of Physiology, it should be kept in mind that the student is not so much dependent on a teaeher for it as for Anatomy, that a knowledgc of it may be in a large measure obtained by the thoughtful study of a good text-book. Merely got-up leetures on a profound subjeet like Physiology ean bc of little or no usc. But a good course of Physiology, by a teaeher who devotes his time largely to the science, and who can draw

his illustrations from Anatomy, human and comparative, and from Pathology, ought to be of great value. The time saved by avoiding the repetition of anatomical description, with which the student is already familiar, should be given to illustrating the phenomena of life by experiment. To see a well-conducted experiment is of greater value than to listen to an hour's talking. There should also be a regular and careful examination in the Physiology class, so as to see that the student understands phenomena, and reasons well from them. Indeed, the Physiology course admits of being, to a large extent, conducted by the tutorial method—the question and answer method, with explanations, the teacher also showing experiments.

PART II.—*Further Observations in connection with Medical Education.*

I have long spoken and written against too much lecturing in Medical Education. But some have carried this too far, not discriminating between use and abuse. Besides setting a limit to the number, the question is not so much one between lectures or no lectures, as between good lectures and bad.

There may be three kinds of lecturing—1. Elementary description, like a spoken text-book; 2. Criticism and discussion; 3. Exhibition and explanation of objects or experiments.

It should be borne in mind that now there are good text-books in all the departments of medical education, and that these are in the students' hands; that the sciences are too extensive to be treated exhaustively, and that especially mere details are unsuited for the lecture room. Also that the most vicious form of lecturing is that of addressing the memory, usually termed cramming or grinding. A good lecture will partake of the three kinds above indicated, in proportions varying with the nature of the subject; it should be devoted to the illustration and enforcement of the great facts and principles of the science, to explaining difficulties, to the discussion of different views, to pointing out where further inquiry is needed, and the whole conducted so as to train the student's observing and reflecting faculties, instead of overloading his memory. Lectures will always be more valuable in the demonstrative sciences, as Anatomy and Chemistry. Were the lecture to consist of demonstrations only, it would be more useful if given in a more practical form to small groups, but the value of such lectures depends largely on the due blending of the exhibition of objects and phenomena with the enunciation of ideas and principles, and their application to the art.

Lectures in departments which admit of little objective illustration must be valueless if they are mere compilations. There is the stimulus of the living voice, which no doubt may be great, but that again depends on whose voice it is. More might probably be done in these departments by a system of examination with interspersed explanations and remarks (the tutorial

method), the class meeting on alternate days, the pupils having been directed what to study meanwhile. In this way the student might be guided through the science, and have his difficulties removed better than by formal lectures. The term *tutorial* has been variously used. In our medical schools it has been sometimes applied to the exhibition of objects to small numbers (tutorial demonstration), or to otherwise teaching small numbers, sometimes to examination—the question and answer method with explanations (the tutorial method). By the tutorial method when fully carried out, is to be understood, not examination on what has been previously treated in lectures, but examination with explanations, instead of lectures. The terms "professional" and "tutorial" are sometimes used to contrast the lecturing and the examinational methods, associating the one with the idea of a large class, the other with the idea of a small number. But the teacher may conduct his assembled class by the tutorial method, while formal lectures may be, and often are, delivered to small classes. In point of fact the classes in Arts in the Scotch universities are taught by the professors more by the tutorial than by the lecturing method, showing the professorial system working by the tutorial method. Instead of employing the word "lecture," in the regulations for the medical curriculum, it might be better to adopt the word "meeting," as suitable to any form of teaching.

The system of reading lectures in medical education is objectionable. Besides the want of distinctness and life in the delivery, the inevitable tendency in the case of rapidly advancing sciences, is for the manuscript to get behind the age. It is to be feared that these venerable manuscripts are still too common in the medical schools.

But even the best lectures become an evil when carried to the extent of interfering with practical study. This is the tendency in a crowded school where it is scarcely possible sufficiently to overtake the practical teaching of individuals. Again, when the school is small and unendowed, the teacher generally cannot afford to give much time to teaching or to preparation for it, and as lecturing of a kind, is the easiest and shortest method, a course of lectures written once for all is apt to be repeated from year to year. There can be no doubt of the paramount importance of practical study and instruction, by which I mean the pupils being afforded opportunities and at the same time having instruction given by a teacher, to individuals or to small groups. Every teacher should have not merely his lecture room and museum, but also his practical room in which the members of the class can work, and where he can work with them, training them to observe and act for themselves. The first aim of a school, and of each teacher, should be to set aside a sufficient time for practical study, including hospital work. The number of lectures may be reduced with advantage in most of the departments, and all the lectures, or meetings, should be as practical as possible. In Anatomy and Chemistry a systematic class should meet daily, as they depend so much

on the teacher, the objects and experiments to be shown and explained being so numerous. For Physiology, Materia Medica (if in the Winter Session), and Surgery, three meetings a week might suffice. If the practice of Medicine class meets daily, from the great extent of the subject, the tutorial method should be largely employed. If the systematic teachers of Surgery and Medicine are, as they always should be, also hospital teachers, they will more readily see their way to not giving too many systematic lectures. In the Scotch universities the courses of Midwifery and Materia Medica are each courses of one hundred lectures. They should be reduced to fifty, as in other schools. The subject of Midwifery may be at least as fully treated in fifty lectures as that of practice of Medicine in one hundred. Besides, it may be questioned whether a college lecture room is exactly the place to learn Midwifery and Diseases of Women and Children. The teachers of Materia Medica and Medical Jurisprudence should have commodious laboratories fitted up, where the pupils can work, and in which the meetings could be held rather than in the lecture room whenever there is anything practical to be taught. For practical work a class may be subdivided when necessary, the teacher attending daily, and half of the class on alternate days. There should be extensive museums connected with every school, and arrangements made so that the specimens can be studied on the shelves, not merely seen hurriedly on the lecture-table. The dissecting room should be open throughout the day, with superintendence and frequent demonstration. The chemical laboratory the same. The hospital should have not less than two hours set apart for it, with daily clinical instruction at the bedside, and arrangement made for practical instruction in Pathological Anatomy. In the Summer Session, the same practical instruction, Anatomical, Chemical, Clinical and Pathological should go on uninterruptedly; and the courses of Botany, Midwifery, Medical Jurisprudence, and perhaps Materia Medica should be delivered then, taking care not to crowd too much into the comparatively short space of the Summer Session.

I may mention farther the opinions which I have been led to form regarding instruction in several branches. The teaching of *Practical Chemistry* in the medical schools seems to me not to have made much progress, as to method, for many years. The custom still, I understand, continues of teaching a class of some twenty-five pupils at a time, for an hour a day during three months, and this not till a systematic course of lectures has been completed. Instead of this, to which the term "practical" is scarcely applicable, the systematic and practical should go on together, as in Anatomy; the laboratory being open all day as the dissecting room is, the pupils working under the direction of the demonstrator, as in the dissecting room. The first-year students should be working in the laboratory almost as much as in the dissecting room. It is the year they have most time for it, and they would thus not only understand Chemistry better, but would get from the beginning the habit of conducting chemical operations.

Pathological Anatomy,—General and special, should be more prominently and practically taught than it is in British schools. It is a question how far the more thorough teaching of Pathology, together with clinical lectures, might supersede the necessity for systematic courses of Medicine and Surgery. Systematic lectures on the principles of Medicine and Surgery, however, are useful if good and not too numerous, while Clinical lectures are too apt to be merely systematic lectures without system.

Clinical Instruction.—No part of medical education stands more in need of re-consideration than the present hospital system. How best to utilise our hospitals for medical education. The present system is on the whole very loose. There may be no farther evidence of attendance than signing a book once a quarter or once a month, the pupils crowd here or there without order or system, and valuable opportunities are not made use of. The hours of visit should be arranged so that the visit to the surgical and medical wards is at different and successive hours, so that the pupils who wish may have the benefit of both. Instead of the system of giving what are called "Clinical" lectures to the pupils assembled in the theatre, there should be true Clinical instruction given at the bed-side, and to a number so limited that each pupil can be trained. Some system should be arranged by which the pupils would be distributed among the different physicians and surgeons, whom they would follow on certain days, or during a certain part of the session, each teacher keeping his list and seeing that his allotted pupils attended. The pupils should not be merely onlookers, or merely talked to, but should be trained to use their own eyes, ears, and hands, their own powers of observation and reflection. Any remarks which are unsuitable to be made in the patient's hearing may be made at the end of the visit in another room. Clinical medical lectures used even to be read when I was a pupil, and I understand that the practice is far from being unknown at the present time. An instance is known to me of a teacher who wrote his "Clinical" lectures a year before they were to be delivered. But even oral Clinical lectures given in the theatre to the assembled class, are of little real value as the pupils see the cases at a distance and receive no training; and they are objectionable as leading away the attention both of teacher and pupils from the true system of Clinical instruction, and as occupying time which should be spent in the wards. It is a mistake to appoint one, or only a part of the hospital staff to give the Clinical instruction, to the exclusion of the other physicians or surgeons. It leads to crowding to the lecturing system, and curtails the field for Clinical illustration. Every physician or surgeon to an hospital is virtually a Clinical teacher, and should be formally acknowledged as such. In the regulations of the licensing bodies it would be well to substitute for the words "Clinical lectures" the words "Clinical instruction."

The practice followed at some hospitals of distinguishing between hospital

pupils and Clinical pupils is injurious. Its tendency is to promote the lecture-room system at the expense of the bedside system, the temptation being to reserve the teaching for the theatre, when the "Clinical" pupils can be met apart from the mere hospital pupils. The hospital entry should include Clinical instruction, and all hospital pupils should be at the same time and equally Clinical pupils. Clinical teachers are worthy of their reward for this no less than for their systematic teaching, but they should be remunerated, not by drawing an injurious distinction between hospital and Clinical pupils, but by receiving the hospital fees, which may be regulated accordingly. I am convinced that the removal of this distinction between hospital and Clinical pupils is a point of great importance, lying at the root of progress in a true Clinical system. My opinions regarding Clinical instruction were formed during my long connection with the Edinburgh Surgical Hospital, and have been strengthened by what I have observed since.

I am desirous of alluding to another part of medical education, the neglect of which in most of our schools has a narrowing effect, and is liable to be attended with serious results. I allude to the *History of Medicine*. It is important that a young man in being educated for the medical profession should know something of the long and instructive history of medical opinion and practice, of the revolutions which they have undergone, and of the delusive systems which empirics have set up under various names. It would enable him to form a more just estimate of the aims and value of modern Medicine, to discriminate better between what may be due to nature and what to art, to avoid being led away by delusions, new or old, and more readily afterwards to abandon whatever the progress of science had proved to be erroneous. I would not propose to burden the student with attendance on a course of lectures on the History of Medicine, but the attention of teachers might be more directed to the subject, and to the importance of recommending their pupils to study the history of their profession.

I understand that, at present, the inquiries addressed to me are limited to education, and do not include the question of the best method of conducting the pass examinations. The method of conducting these has an important bearing on education, and on the value attached to different methods, and, I believe, admits of being in several respects considerably improved. This, I presume, may form the subject of subsequent inquiry.

WILLIAM TURNER, Esq., *Edinburgh.*

I beg to return the following reply to the queries respecting the teaching of Anatomy and Physiology, on which the Committee of the Medical Council have expressed a wish to hear my opinion.

1.—*Anatomy.*—(*a.*) I consider that every student of Medicine ought to make himself well acquainted with the human bones, joints, muscles, fasciæ, vascular, and nervous systems, organs of sense and viscera. I think it of importance that he should study them not only topographically but as systems of organs which fulfil definite functions in the economy. His studies should not be confined to such features in their structure as the naked eye alone can recognize, but should embrace their more minute characters, which require the aid of the microscope to determine. Every medical school ought to be so organized as to give to the whole of its students satisfactory opportunities of acquiring a practical knowledge of general as well as of topographical and systematic Anatomy.

I may mention that, not only in the University of Edinburgh, but in the other Scottish universities possessing medical schools, general, systematic, and topographical Anatomy are taught by and under the direction of the Professor of Anatomy, with the aid of one or more assistants or demonstrators. In the Scotch schools the Professor of Anatomy devotes his whole time and energies to his work as a teacher. I believe, when a sufficient remuneration can be offered to induce a competent man to give himself up to Anatomical teaching, that the instruction afforded will be of a more thorough character than when only a limited portion of the teacher's time is given to the work.

(*b.*) Owing to the important relations of Anatomy to the practice of Medicine and Surgery, I am of opinion that a thorough training in this subject is essential to the efficient practice of the medical profession. From the extent of the subject, from the numerous important details which it embraces, from the fact that these can only be acquired when at a medical school, and that constant repetition and observation are necessary in order to implant them firmly in the memory, I hold that the period of Anatomical study ought to extend over the first three years of a four years' course.

(*c.*) I consider that Anatomy ought to be taught by lectures, demonstrations, and the practical work of the student in the dissecting-room. I do not agree with those who hold that systematic lectures are of little value in medical education. A well-considered, well-arranged course of lectures, properly illustrated by dissections and preparations, appeals both to the eye and ear of the student, his attention can be directed to those topics which are

most important, and a greater amount of instruction can be imparted to him in a given time than if he were left to acquire it without such guidance.

Demonstrations form also an important part of Anatomical teaching, and a demonstrator is a necessary official in a medical school. Students require to be shown how to dissect, how to display structure for themselves, and an active and intelligent demonstrator communicates much valuable information on the relations of Anatomy to the practice of Medicine and Surgery.

It is only, however, by the labour of his own hands that the student can acquire such a thorough acquaintance with the Anatomy of the human body as to give him full confidence when he is called upon to apply his knowledge of the subject to the practice of his profession. It is only by dissection that he can properly learn how to recognize parts by eye and touch, so as to make him a safe and ready operator. I am of opinion, therefore, that every candidate for a surgical or medical diploma or degree ought to produce evidence that he has dissected the human body once at least, whilst for the higher surgical qualification a still greater amount of dissection ought to be required.

I may mention that in Edinburgh the practice of dissection is not confined to the winter months, but that the rooms are open from the 1st October to the end of July. A considerable number of students avail themselves of this additional opportunity of improving their practical knowledge of Anatomy.

2.—*Physiology.*—(*a.*) Every student of Medicine ought to make himself acquainted with what is definitely known, or generally understood, to be the functions of the different organs of the human body. From the difficulty experienced in obtaining experimental proof of the functions of some organs, to a certain extent physiological teaching involves the discussion of various theories and hypotheses. The amount of time which may be occupied in these discussions will, I apprehend, have to be left to a large extent to the judgment and discretion of the teacher.

(*b.*) As some knowledge of the structure of the human body is necessary before a right estimate of the functions which it performs can be obtained, I do not think it advisable that a student should commence his attendance on his physiological teacher until he has mastered the elements of Anatomy. The most convenient time will be during his second year's attendance at a medical school.

(*c.*) With Physiology, as with Anatomy, much valuable instruction may be conveyed by means of a well-arranged course of lectures. From the great stimulus which has recently been given to physiological research through the employment of the exact methods of chemico-physical inquiry, many important facts can now be experimentally demonstrated to the student. Where these demonstrations do not involve the destruction of animal life, or when they do not inflict pain, they may advantageously enter into a course

of instruction in Physiology. To some extent, as for example the examination of the blood and urine, and some of the more useful and easily investigated departments of microscopic inquiry, the student ought to be instructed in the simplest and most easily applied methods of research, and made to perform the experiments with his own hands. Where the experiments are, however, of a more difficult nature it would, I believe, be a waste of time, and productive of no practical benefit, to attempt to give instruction in the mode of performing them to the generality of students of Medicine.

MATERIA MEDICA, PRACTICAL PHARMACY, AND THERAPEUTICS.

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REPLIES.

Dr. ANSTIE, *London.*

A very unusual press of engagements, and especially the fact of my having been engaged in editing a new journal of Therapeutics, has entirely prevented my attending to your previous queries as Chairman of the Medical Council's Committee on Education. I have also been unfortunate enough to mislay your letters. I intend, therefore, to answer you informally now on certain points which I am very anxious to speak about, and if the Committee insists on having all answers in a formal shape, I must trouble you to send me another copy of their printed questions.

What I desire now to say concerns the two following matters:—

1. "The mode of teaching Materia Medica, Pharmacy, and Therapeutics;" and
2. "The period of Medical Education at which these subjects should be put before the student."

1. I am of opinion that to mix up Materia Medica and Pharmacy with Therapeutics in formal lectures is a great mistake. I know no such ridiculous, or rather melancholy, waste of time as is committed by the teacher who finds himself obliged by custom to lecture on the chemical and botanical characteristics of drugs, and the mode of making them into mixtures, &c. It is utterly useless, for the students never remember a single word of it afterwards, and have to learn the whole thing up again, as they should have done at first, from their books, and from the specimens in the museum, and the actual practice in an hospital or private dispensary. What would be of real use is a tutorial assistance of them in these practical studies. All this might be done in the first summer.

2. The subject of Therapeutics, which is one of the most important, indeed ought to be considered *the* most important of all which the student has to learn, is, I think, very much mismanaged and neglected. Many teachers, from what I hear, say very little about it during their lectures on Materia Medica and Therapeutics. And those who, like myself, have always considered that it ought to be treated as infinitely more important than strict Materia Medica (which is properly a tutorial subject), feel the immense difficulty of conveying intelligible ideas concerning the action of drugs, and

(what ought always to be simultaneously explained) the action of foods, upon the body, to students who are only in their first or second year.

I am decidedly of opinion that Therapeutics should only be taught by men who have personally devoted themselves to original research on the nature of drugs, and who also possess a competent knowledge of modern Physiological Chemistry, and that their audiences should consist exclusively of students who have passed through every other part of their medicinal course, including hospital practice, for at least six months on the medical, and six months on the surgical side. Only such men are fit to hear about the action of drugs; but that they should be allowed to go into the world as practitioners without having had the kind of advanced teaching on this subject to which I have referred is, to my mind, scandalous.

Dr. JOHN ATTFIELD, *London.*

(*Answer already given under "Chemistry."*)

Dr. COWAN, *Glasgow.*

I have received your circular of date 6th Aug., in which you request my opinion on the following points. This I shall give as briefly as possible.

1. "The topics which may be most advantageously included under the subject of Materia Medica, Practical Pharmacy, and Therapeutics."

My course of lectures is mainly devoted to the consideration of Pharmacology, general and special. The study of Practical Pharmacy during three months in a laboratory being required by the regulations for graduation, renders it less imperative on me to devote much time (even if at my disposal) to this branch; but the principal processes, mechanical as well as chemical, are described and illustrated.

The want of proper accommodation in the present college buildings prevents full practical instruction in Pharmacy being given in connection with the class of Materia Medica; but this highly desirable result will be attained in the new university. A few lectures on Dietetics are given towards the close of the course.

2. "The period in a four years' course when they can be most profitably studied, and the length of time which should be devoted to them."

Materia Medica, third Winter Session; course of six months. Practical Pharmacy, summer after third Winter Session; three months.

I am clearly of opinion that a full satisfactory course of Materia Medica and Therapeutics cannot be accomplished in less than one hundred lectures. Dietetics might be made the subject of a short voluntary summer course.

3. "The manner in which they can be best taught," &c.

I give with diffidence my views on this point. Still I think it right to say that, bearing in mind the previous instruction of students in Botany and Chemistry, it seems to me expedient with a view to economy of time to avoid entering upon any lengthened exposition of these departments in connection with the Materia Medica. The students of my class are examined for a brief period daily upon what has gone before, and specimens of medicinal substances and compounds are put in their hands, so as to familiarize them with their appearance and sensible properties.

In short, practical instruction should be combined with lecturing in teaching Materia Medica, and with special reference to Therapeutics it is highly desirable that in all schools the lecturer on Materia Medica should have hospital wards under his care.

A laboratory should be connected with the class.

I may add that, from what I have seen as an Examiner at two Boards, I am satisfied that, as a rule, too little attention is paid to teaching the art of extemporaneous prescription. In making these few remarks I have kept in view the desirability of not increasing the number of lectures or courses of lectures obligatory upon the student.

Dr. FREDERICK FARRE, *London.*

A long absence from London in Germany, and the pressure of business since my return, are the only excuses I can offer for not having replied to your letter earlier. I imagine I shall best do so now by telling you how I teach Materia Medica, Pharmacy, and Therapeutics myself.

I do not consider the order in which Materia Medica is taught very important. I see little objection to an alphabetical arrangement; but I think the Natural History order is equally convenient, and has the advantage of also being instructive by bringing together substances allied in their nature and often in their effects. If either of these methods is adopted, all that need be said of any drug may be said at one time and in one place. I consider the Therapeutic, or rather Physiological, order least adapted for primary instruction in Materia Medica. Many drugs, as tartarated anti-

mony, ipecacuanha, strychnia, subchloride of mercury, tartrate of potash, &c., have several modes of action, varying with the dose and mode of administration, and must be referred to several times under different heads.

In my own teaching I use the Natural History order, and divide the primary articles of the Materia Medica into three groups, mineral, vegetable, and animal.

By the primary articles I mean—1. The salts, acids, alkalies, &c., used officially in medicine which are prepared by the chemical manufacturer; 2. The portions of plants and animals and the vegetable and animal secretions which occur in common, and which are also enumerated in the *Pharmacopœia*.

I describe the mineral acids under their principal elements, carbon, phosphorus, sulphur, nitrogen; and the alkaline earths and salts under their respective metallic elements, sodium, potassium, calcium, iron, zinc, &c.

In describing vegetable substances and secretions, and vegetable acids and alkaloids, I follow De Candolle's natural order; but I am content to name, without describing, the natural orders themselves, and even the plants which yield the vegetable drugs, unless they are natives of, or are cultivated in, this country (in which case only the student is at all likely to be familiar with them). In short I direct attention chiefly to the substances actually used in Pharmacy.

It is no doubt useful in books to describe exotic medicinal plants at greater length and with more minuteness for the sake of those who wish to know their botanical character; but to most students such information is of little value, and certainly in a lecture is almost useless.

Having described each article, I mention its effects on the body, its physiological action, and its therapeutic use in disease, and the modes in which it is administered, which introduces the medicines and compounds of the *Pharmacopœia* and their usual doses.

There is one difficulty in teaching the Therapeutic part of the subject, namely, that the student attends the lectures generally in his first summer, before he has received any systematic instruction in Medicine; and having, therefore, little knowledge of disease he can scarcely understand its treatment. Still this part of the subject, though it can only be imperfectly understood, is far too important to be omitted.

Having then gone through the subject in this order, and having described the articles themselves, and the modes of ascertaining their purity or goodness, and the various effects which they produce, I then arrange the articles physiologically, or therapeutically, and show their comparative power of producing any particular effect on the body, and the various ways in which they produce it.

Much, however, of the knowledge of the students is not gained from teaching either by lectures or books, but by their own investigation and

observation. As a student can only become familiar with the sensible qualities of drugs by constantly seeing and handling, and tasting and smelling them, it is important that every facility should be afforded him for this purpose. In my own museum the following arrangements are found sufficient :—

All the mineral substances of the *Pharmacopœia* are arranged in stoppered bottles on shelves, and labelled after the *Pharmacopœia*.

The roots, barks, leaves, fruits, gums, resins, &c., are kept in large boxes on which the name is visible. A second collection of smaller specimens is also kept, the names of which are on the under side of the boxes, so as not to be readily visible. This collection is intended to afford an opportunity of testing the knowledge previously gained.

All these specimens are open to students at all times, and require to be frequently renewed.

A third collection of fine specimens, both animal and vegetable, is kept in bottles in glass cases, that they may not be injured by examination, but may always show to the eye what a drug should be.

I have also wooden models of crystals; but as students never believe in models, I endeavour to procure also large selected crystals of all the salts themselves, to show their typical form.

Of course I have also large plates of medical plants, both for the lecture room and the museum, and I illustrate the lectures by dried and fresh plants, &c.

Practical Pharmacy is best taught in an hospital dispensary, or in a chemist's or apothecary's shop.

I hope that these few remarks may assist the Medical Council in their object.

Dr. ALEXANDER FLEMING, *Birmingham.*

I have much pleasure in replying to your letter of August 5th, 1868, requesting my opinion on the following points :—

1. "The topics which may most advantageously be included under the subject of Materia Medica, Practical Pharmacy, and Therapeutics."
2. "The period in a four years' course when they can be most profitably studied, and the length of time which should be devoted to them."
3. "The manner in which they can best be taught—by lectures, practical instruction, or otherwise."

It is needful to observe here that in my remarks I assume the division of Winter and Summer Sessions, and the arrangement of professors as they now exist in the medical schools. If the whole scheme of medical instruction were to be arranged *de novo*, my suggestions would be somewhat modified.

I would arrange the instruction on the subjects above mentioned in two courses, viz. :—

1. One of Practical Pharmacy, and
2. One of Therapeutics and Materia Medica.

The student having previously studied Chemistry and Botany, I would assign Practical Pharmacy to the second Summer Session ; and again, the student having in his first two years studied Anatomy, Physiology, Chemistry, and Practical Pharmacy, I would assign the course of Therapeutics and Materia Medica to the third Winter Session.

In the course of Practical Pharmacy, instruction should be given in the general principles of Pharmacy, and the student should be required to make the more important preparations of the *Pharmacopœia*, and to practise the methods therein indicated for testing drugs. This course should be conducted in the laboratory of the hospital, where the student should at the same time receive instruction in the art of dispensing. In this course formal lectures are not desirable, and the instruction should be tutorial and practical. If this be conducted efficiently the student will become acquainted with the physical and chemical characters of drugs, of their preparations, the modes of their exhibition, and the doses ; and will thus have laid a basis of useful information in preparation for the course of Therapeutics and Materia Medica which should follow during the ensuing winter session.

The subjects of Therapeutics and Materia Medica should be taken in their larger signification, and embrace the study of both hygienic and medicinal remedies. They should include the consideration of their general physiological and curative actions ; their special actions, their modes of action and of cure; of the influences modifying their effects, of their forms and modes of exhibition, and of the classification of medicines. I consider that the drugs should be arranged according to their action on the body in health, and throughout the whole course the constant aim of the teacher should be to convey as complete a knowledge as may be possible of the action of drugs in health, and their uses in disease. In the description of individual medicines the operation of allied drugs in the several classes and orders should be carefully compared and contrasted, and the physical, botanical, and chemical characters should be dwelt upon only in so far as they contribute to a better understanding of the physiological and therapeutical properties. I suspect that much time is often spent in undue and wearisome detail on the botanical and chemical characters, which might be usefully devoted to the more thorough study of their action and uses.

Mode of Instruction.—I should recommend three professional lectures of one hour's duration weekly—say on Monday, Wednesday, and Friday ; and, that on the Tuesday, Thursday, and Saturday, the instruction should be tutorial, and, as far as the subjects will permit, practical.

It has always appeared to me better to continue the time-honoured plan of associating Therapeutics and Materia Medica in the same course, which thus embraces a happy union of quantities and detail, of abstract and concrete, and gives more variety, and certainly more interest, to the lectures, than would attach to either subject treated separately. I have good reason to believe that the course arranged as indicated has as much interest for the student as any subject in the whole curriculum.

It may be objected to our placing this course in the third winter of study, that diseases must be referred to of which the student is ignorant, from his not having yet attended the lectures on the practice of Medicine; and no doubt this is a difficulty. But it is obvious that in conveying a knowledge of diseases and their remedies, either one or the other must have the precedence, and there is much convenience in the knowledge of the remedy taking the first place, as it enables the student to follow with the fullest advantage his professor of the Practice of Medicine in his description of special diseases and their treatment. Moreover, this difficulty is more apparent than real, when it is remembered that the student is attending hospital practice during all the four years of his curriculum, and acquiring from the first a knowledge both of diseases and their remedies.

This leads me to notice the most important mode of instruction in Therapeutics—the tutorial and clinical. It is in the hospital especially that instruction should be given in the treatment of individual diseases, and the student taught to appreciate the numerous conditions which modify the general rules laid down in the systematic course. It is here also that he should receive daily lessons in the art of prescribing. I regard the Clinical Therapeutics as an essential complement to the systematic course of instruction on this subject, and I am led to insist the more on this point from the belief that in the course of Clinical Medicine the therapeutical element is not always sufficiently remembered.

Dr. W. FRAZER, *Carmichael Medical School, Dublin.*

The subject of teaching Materia Medica has for some years attracted my attention, and I feel assured that some decided alterations are required to train students for the safe discharge of their profession in this branch of Medical Education. I venture briefly to indicate the directions which it seems to me our efforts at an improved state of matters ought to take.

1. The course of study requires to be limited and better defined.
2. Practical Pharmacy ought to be taught to junior students in a special laboratory in every medical school in the manner that Practical Chemistry is (or should be) taught.

3. Lectures on Therapeutics and Prescribing might replace, for senior pupils, the present system of lectures.

1. Limitation of the Course of Study.—This principle is acted on by the London University in Botanical Examinations, and I have felt that its adoption for Materia Medica would be so advantageous, that some years since I suggested to the Senate of the Queen's University all students entering for "Pass Examinations" might be restricted to a limited well-defined course of subjects, with benefit to themselves and to the public service. I drew up a list of drugs which would suffice for their commencing the practice of Medicine, excluding drugs of secondary or doubtful value, which at present only distract the student's attention, and often deter him from learning that minimum of Materia Medica which he requires for safe practice. The *British Pharmacopœia* is too extended; it is the handbook of reference for all grades of the profession, and therefore must embrace substances of widely different value to the practitioner, who requires rather, when commencing life, to be thoroughly grounded in a limited *rôle* of reliable agents for combatting disease.

For "Pass" Examinations, mere historical knowledge of medicines, botanical questions, and chemical processes that are not of practical importance should be altogether eliminated, or restricted to a secondary position; they are better suited for men seeking higher qualifications, honours, &c. Thus, no practitioner ever makes, or need know how to make, calomel, corrosive sublimate, morphia, aconitine, or chloroform; they are invariably prepared by wholesale manufacturers, and it would be as profitable for a student to know how to make coal gas as to learn such processes as these. Nor does it signify to him where or how scammony, aloes, or gamboge are got. He should be required to recognize these substances, and, when necessary, to identify them by applying simple appropriate tests; he should know their probable adulterations, and how to detect them; he should be familiar with such native plants as belladonna, conina, aconite, digitalis, stramonina; and, above all, he requires to understand the probable effects and average doses of these and similar drugs, and how they can be best employed for relieving suffering.

Again, to illustrate my views, there are, under "Ferrum," in the *Pharmacopœia*, thirty-one salts or preparations. I venture to say that half-a-dozen, well selected, would suffice for all the requirements of ordinary practice—say the iodide, sulphate, per-chloride, per-nitrate, and tartrate; for those desirous of employing less known salts, reference to the text-books would afford them the knowledge they require. Opium has nineteen distinct preparations, varying in strength; and it is expected that every student shall commit to memory their composition and relative energy: if he does

go to this trouble when preparing for examination, he soon forgets the worthless knowledge and confines himself to a few selected from the list.

2. Instruction in Practical Pharmacy.—A course of this description would be more useful for students than the present Practical Chemistry Class. It should include instruction by the teacher, and absolute work by the pupils themselves, in preparing the chemical and pharmaceutic compounds in ordinary use, or, if a proper division of labour were made, the Chemistry Class might undertake the pharmaceutic chemicals, and the Pharmacy Class the rest of the course. In any way, students should be taught to make such preparations as liquor potassæ, lime water, arsenical solution, &c.; how to make infusions, decoctions and extracts, tinctures, pills, &c.; and, finally, the reading and compounding of prescriptions for ordinary use.

This course, it seems to me, would be best attended by junior pupils, excepting only such as have served *bonâ fide* apprenticeships to apothecaries; its expense, if well selected, ought not to exceed that for Practical Chemistry. The present system of trying to learn Pharmacy in the dispensary of an hospital, or by a few months' instruction in a surgery, is absurd. It is deficient in systematic instruction; nor does mere measuring or weighing of drugs already prepared, in any sense, imply what I understand by Practical Pharmacy.

3. Systematic Instruction in Therapeutics and Prescribing.—This would replace the present desultory courses of lectures, and be best taught to senior pupils familiar with hospital practice. That such instruction is required every examiner will admit, for, at present, few who obtain diplomas are able to write, dictate, or even read an ordinary prescription, and too many, who are skilled in the diagnosis of disease, know but little of the rules of practice or the mode of applying remedies.

Another suggestion, which I consider most important for advancing the study of Materia Medica, is that the examiners on this branch in our Colleges, &c. should (following the example of London University and the Queen's University) be selected from those who have specially cultivated the subject. The examination itself, instead of being restricted to mere questioning, ought to be made practical. Candidates, before being licensed, should be obliged to demonstrate their acquaintance with Pharmacy by recognizing those chemicals and drugs in ordinary use; if time admitted, by compounding some suitable prescriptions, and applying tests to discriminate between substances liable to be confounded together, and to detect ordinary adulterations; finally, bring him to a bed-side, or submit a detailed statement of some ordinary disease, and, if he is fit for practice, I would expect him to explain what the method of treatment should be, and to prescribe

accordingly. Above all, no one should be permitted to hold a diploma who displays gross ignorance even of the ordinary doses of common drugs, or the appearance of medicines in every-day use.

I have ventured to indicate rather the direction in which reforms appear required than to lay down absolute changes. Three months, as now devoted to a course of lecturing, are *quite insufficient* for teaching Materia Medica. I think a three months' course of Practical Pharmacy would suffice, and then three months devoted to Therapeutics, &c., should go far to complete the student's education. Allowing the entire winters for Hospital Dissections and Medical and Surgical Lecturing, it would not over-burden the student in summer to ask from him two courses of Materia Medica: the one in the early part of his education, for *Practical Pharmacy;* the second, much later, to be devoted to *Therapeutics.*

Dr. GARROD, *London.*

Dr. Garrod begs to forward to the Chairman of the Committee of the Medical Council the following answers to the three queries:

1. Dr. Garrod considers that the topics most advantageously included under the head of (*a*) Materia Medica, are—the origin, physical and chemical characters, tests for purity, nature and composition, of all the well recognized drugs; in fact, a knowledge of the *British Pharmacopœia*, the information being on many points somewhat extended.

(*b.*) Under the head of Practical Pharmacy the mode of preparing the various preparations of the *British Pharmacopœia.*

Dr. Garrod would include under the head of Materia Medica, the knowledge of the composition of the principal articles of food; the line between food and medicines being often very undefined, and an acquaintance with such knowledge most important to the medical practitioner.

(*c.*) Therapeutics should include the real action of medicine and medicinal agents upon the system, and their value in relieving disease; also the value of food in disease and the proper regulation of diet in different conditions.

2. Dr. Garrod thinks the subjects of Materia Medica and Pharmacy should be taught during the first Summer Session, and the subject of Therapeutics during the second Summer Session. The student will thus have obtained a knowledge of Chemistry before studying Materia Medica and Pharmacy, and some knowledge of Medicine before commencing attendance on the course of Therapeutics; supposing that Chemistry continues to be taught during the first winter, and Medicine during the second winter session, the length of time devoted to each division would be three months.

3. Dr. Garrod considers that Materia Medica and Practical Pharmacy should not be taught by lectures, but by practical demonstrations and examinations in the museum or elsewhere by the aid of specimens, &c., and that the teacher of such subjects need not necessarily be a medical practitioner.

On the other hand, he thinks that a short course of about thirty lectures should be devoted to the subject of Therapeutics, and the teacher a physician to an hospital.

Dr. Garrod feels quite sure that practical Pharmacy is at present most imperfectly taught in the dispensary of an hospital; the dispensing of drugs being usually performed so rapidly and imperfectly as to engender habits of carelessness, and the instruction on Pharmacy practically amounts to nothing.

Dr. S. O. HABERSHON, *London.*

In reply to the questions submitted to me by the Committee of the Medical Council, I believe that the topics most advantageously included under the subject of Materia Medica, Practical Pharmacy, and Therapeutics are as follows:—A description of medicinal agents, especially those which are mentioned in the *British Pharmacopœia*, comprising a general account of their source, the principle of their preparation, the tests of purity, their general and physical characters and the substances with which they are incompatible, and also their physiological effects, therapeutical uses, doses, and modes of administration. If possible, the forms of diet applicable in disease, the use of baths and mineral waters, of cold and heat, should be included; but too much time would be absorbed by entering fully into the applicability of change of climate, and by describing the employment of electricity. Some knowledge of the compounding of drugs, should be acquired.

As to the "period of study," I believe that Materia Medica and Practical Pharmacy should be placed in the first Summer Session, but Therapeutics during the second or third.

In reference to the "manner of tuition," Materia Medica and Pharmacy would be best taught by practical demonstration, but Therapeutics by a course of lectures, combined with clinical illustration and instruction.

Dr. ALEXANDER HARVEY, *Aberdeen.*

In compliance with the request contained in your printed circular of 5th August last, namely, that I would give you in writing my opinion on certain points bearing on the subjects of Materia Medica, Practical Pharmacy, and Therapeutics, I beg to state as follows:—

1. "As to the topics which may most advantageously be included under the subjects above named."

Excluding meanwhile Practical Pharmacy, excluding also Therapeutics, and confining myself to the Materia Medica proper, I would at once say that the *British Pharmacopœia* exhibits very fairly the topics that demand attention on the part of medical students. But as the *Pharmacopœia* is not, by reason of its purely alphabetical arrangement, well adapted to serve as a text book in teaching, I would refer to the third edition of Dr. Garrod's "Essentials of Materia Medica," published during the present year, and adapted to the *British Pharmacopœia* of 1867, as a fair exponent of all that the student need concern himself to know.

In all that relates to the Materia Medica proper, Dr. Garrod's book is in the main a reflection of the *Pharmacopœia*, conveniently arranged for the student, with some supplementary matter of his own.

As to this supplementary matter, Dr. Garrod seems to me to have exercised a wise discretion; and therefore it is that I refer to his book in connection with the question before me, namely, the question of topics. Comparing this work of his with the late Dr. Pereira's "Elements of Materia Medica," the one a single volume of moderate dimensions, the other virtually an Encyclopædia in three huge volumes, one will at once see that the subject of the Materia Medica is, in itself, practically illimitable. The teacher of this branch may, if he likes, give a minute description of the plants and animals that furnish officinal products, of the minerals, &c., furnishing such products; and he may also describe at great length, the manufacturing, chemical, and pharmaceutical processes by which those products are obtained; and he may bring in also the commercial history of drugs and products.

It is specially important to bear in mind with regard to this branch, that the subjects included under it are exceedingly multifarious, and that they are to a large extent matters of pure memory, which the student finds it difficult to reproduce on demand. The great object in teaching should be to enable the student, as best he may, to master the official *Pharmacopœia;* to become familiar with the brief yet admirably drawn descriptive character there given of drugs and chemicals; to understand the purity tests and the *rationale* of the processes therein contained; and to have a ready recollection of the main constituents of the official formulæ, and the whole subject of doses. To do

all this, and to do it well, is work enough for any student, even the most intelligent and industrious. And for the teacher to go beyond the limits of the *Pharmacopœia*, or beyond what bears directly on the illustration of it, and thereby enables the student to comprehend it fairly, is, it seems to me, labour thrown away.

As regards the subject of Therapeutics. Premising that it divides itself into two branches, first, General Therapeutics, and secondly, Special Therapeutics, *i.e.*, the actions and uses of individual drugs. I could desire for the students nothing more or better, as an epitome or ground work, than what is contained in Dr. Garrod's book. In connection with each article of the Materia Medica, he gives a brief but fair account of its actions and uses. And at the end of the work, we have an admirable outline of General Therapeutics. Simple, comprehensive, and at once scientific and practical. As regards both the special and general Therapeutics, the book might with advantage to the student be made fuller in details. But these details the teacher can supply.

As regards Practical Pharmacy, I shall advert to it hereafter.

2. Next, "as to the period in a four years' course when they can be most profitably studied, and the length of time which should be devoted to them."

This question is twofold.

1*st*. As to the period when the Materia Medica should be studied.

In answering this question, it is to be borne in mind that Therapeutics has heretofore been always conjoined with the Materia Medica in teaching. And keeping this view, I should say that the two can be most profitably studied at a period not earlier than the beginning of the third winter session, or the third summer session.

To a student who has already attended a course of Botany and Zoology (or Natural History) and Chemistry, nothing were easier than to understand all that part of the Materia Medica that includes the describing of drugs and chemicals, the tests of their purity, the *rationale* of processes, the compounding of the official preparations, and, so far, the authorized doses, in short, all that is comprised in the *Pharmacopœia*. And were the Materia Medica proper disjoined in the business of teaching from Therapeutics, as well special as general, he might profitably enter on the study of it during his second year. And with a view to his hospital attendance, and for other reasons, it is on many accounts desirable that the student should, at as early a period as possible, be familiar with it.

But a student of the second year cannot with any advantage engage in the study of the Physiological and Therapeutical actions of drugs, or their uses and applications in disease. He as yet knows comparatively little of Anatomy, and nothing of Physiology; nothing of Pathology, while he is ignorant even of the names of many important diseases; and has only begun his hospital attendance, and this only in the surgical wards.

On this point I can speak confidently and from ample experience. In this university, unfortunately, Materia Medica forms a part of the first professional examination; and this examination may be taken at the end of the second Winter Session. And it is in fact, taken by the greater number of our students, either then, or at the end of the second Summer Session. The class of Materia Medica here, being now a summer class, is attended partly by first year's students, partly by second year's students, the former predominating.

Now, to discuss before such students whether this or that drug acts primarily on the nervous system, or primarily on the blood by absorption, when as yet they know nothing of the physiology of the blood, or of absorption, or of the brain and nerves,—to discuss the question whether opium is of use in certain states or circumstances of fever, or in certain forms or stages of inflammation, in delirium tremens, or in diabetes, when as yet they have no definite ideas in regard to these morbid states,—is, and must needs be, a task of peculiar difficulty. To discuss with profit, even in a general way, such elementary Therapeutic subjects as narcotics, tonics, alteratives, emetics, diuretics, and the like subjects, which embrace fundamental principles in Physiology and Pathology, which such students have got to learn, is an affair of extreme difficulty. To attain the highest point of all in this department, namely the understanding and the thorough appreciation of the real, as distinguished from the apparent, efficacy of drugs, in the cure of disease, is still more difficult. For it requires a knowledge not merely of the physiological actions of drugs, but also of the whole natural history of diseases, their general nature and natural tendencies (whether favourable or unfavourable), the provisions of nature for the cure of diseases, independently of art, and much besides. Now these are subjects (all of them) beyond the reach of first and second years' students.

What, in my own case, enhances the difficulty of teaching is, that the the subject of Therapeutics is almost the only branch of the general subject of Materia Medica that admits of direct instruction by lectures. With a Pharmacopœia so copious in its matter as is the *British Pharmacopœia*, and with a text-book so complete in all the essential details relating to drugs and their preparations as is Dr. Garrod's book, lectures on Materia Medica, strictly so called, seem to me not only quite unnecessary, but the worst way of imparting such instruction as is requisite. No teacher of Mathematics delivers lectures on Euclid. But of this hereafter. Meanwhile, I have only to say under this head, that so long as Therapeutics shall continue an integral part of a course of Materia Medica, the study of it should be deferred to the third Winter Session; still better, to the third Summer Session; and that in this university it should be made a part of the second professional examination, not of the first.

2nd. As to the length of time which should be devoted to the subjects

in question, it is difficult to speak with precision. Here, as in the other universities of Scotland, a course of one hundred daily meetings of the class is required. It would be easy to extend the course much beyond this; in fact, indefinitely. But having in view the essentials of the subject, and the multifarious demands on the time and attention of medical students, I am inclined to think that a course of sixty meetings (or a three months' course) would suffice.

3. "With regard to the manner in which they can best be taught—by lectures, practical instruction, or otherwise."

General Therapeutics, as also what relates to the physiological action and therapeutic use of individual drugs, may very advantageously be taught by lectures; and these will be all the more profitable to students if strictly based on a text-book in their hands, and made as much as possible a commentary on the statements therein contained. The subject of Therapeutics (General and Spinal) may also be advantageously taught colloquially—*i.e.* by examining the students from the text-book, and making such observations as may arise out of the answers to questions put; yet subordinately to lectures.

But as to all that part of the Materia Medica proper that relates to the characters of drugs, to the purity tests, to the officinal formulæ, to the *rationale* of processes, &c., lectures thereon, formal lectures read from a manuscript, seem to me quite unnecessary. No doubt the lecturer may transfer the matter of the text-book (or of the *Pharmacopœia*) to a manuscript, with any amount of amplification here and there, and he may read this to his pupils. But it is throwing words away. The pupils know that as to all this, they have the marrow or substance of it in print, and in their hands, and that it is matter of choice with them whether to give heed to what is thus addressed to them or not.

As regards this whole department of the subject, and taking Dr. Garrod's book in illustration of the remarks to be made, I should say that it would be best, or most profitably, gone over in the class-room in a practical way. Let the teacher exhibit specimens (good and bad, or what may be called choice museum, and common or shop specimens) of articles of Materia Medica, pointing out how far they agree with or differ from the characters given in the *Pharmacopœia;* let him demonstrate, before the class, the purity tests and explain them; and let him also give the *rationale* of processes, chemical and pharmaceutical, as far as necessary, and as to the rest, let him examine the students from the text-book.

Further, as to this division of the subject, I quite agree with Dr. Parkes in thinking that it might be well to make the pupils read aloud from the text-book—A. B. reading so much; C. D. so much; E. F. so much—the teacher interjecting questions to each, as he reads, or throwing in remarks as occasion offers. I am persuaded that the attention of the whole class would be much better sustained in this way than by reading off from a manuscript for a

whole hour very dry matter on what is to most students a very dry subject. No student in particular knows when he may be called on to read or to be questioned, and all are on the alert.

The words "practical instruction" are introduced into this third query.

This leads me to remark that, as far as I can see, the only way in which real practical instruction in Materia Medica can well be given is in the department of Practical Pharmacy. This is one of the subjects included in the general heading of your printed circular.

Now, as to this branch, it may be remarked at the outset, that in this as in the other universities of Scotland, a three months' course of Practical Pharmacy is required over and above attendance on a systematic course on Materia Medica and Therapeutics. Every candidate shall give evidence by certificate that he has been engaged for at least three months, by apprenticeship or otherwise, in compounding and dispensing drugs at the laboratory of an hospital dispensary, member of a surgical college or faculty, of a licentiate of the London or Dublin Society of Apothecaries, or of a Member of the Pharmaceutical Society of Great Britain.

As regards Aberdeen, this regulation has for many years been a dead letter, and I apprehend that Aberdeen is not singular in that respect. Forty years ago the shop of the Aberdeen Royal Infirmary was crowded with students, and in order to get admission into it students had to make application months beforehand. Now, not one student is to be seen there, and this, with an occasional solitary exception, has been the case for many years. The like is true of the shop of the Aberdeen General Dispensary—a large and important institution.

The regulation in question is in form complied with in this way. A student gives attendance in a chemist's shop in town twice or thrice a week. But he is not allowed to do anything in the way of compounding and dispensing drugs. This is the exclusive work of the chemist's proper shopmen. All that the student is allowed to do is to overlook these shopmen at their work, to handle and look into bottles, to pull out drawers and inspect their contents. He is a mere spectator, not a worker in the shop. He learns nothing, and he sees less than he may at any time see in the museum of the professor. Moreover, his attendance at the chemist's shop is for the most part fitful, and often nominal; yet he gets a certificate from the chemist in terms of the regulation, and the certificate is accepted by the University.

For my own part I regard a course of Practical Pharmacy as one of real importance, and the only effectual way in which I think it can be provided for is, to institute in each school a department of Practical Pharmacy corresponding to Practical Chemistry, and conducted by (or under the eye of) the teacher of Materia Medica. The matter ought, I think, to be taken out of the hands of the chemist and druggist. Difficulties, I am aware, would attach to the teaching of Practical Pharmacy within the walls of a medical school,

but I do not think they would be insuperable. Anyhow the matter is one deserving the consideration of your Committee.

One or two words more. I have said that forty years ago the subject of Practical Pharmacy was well attended to by the students of the Royal Infirmary here, while it is now entirely neglected. The decline is, in my opinion, referable to the vast increase in the number of lectures since then, imposed on our students. Hospital attendance, moreover, and all the more strictly practical branches of medical study have suffered from the like cause. Lectures, to the extent now attended, take precedence of everything else, and practically shut out everything else; useful at a time when good books were scarce and dear, they have been continued and multiplied when the necessity for them has in a great measure been superseded by the publication of excellent text-books on every branch.

In the medical department of the Queen's Colleges in Ireland, lectures on each branch, with the single exception of Anatomy, are delivered only on three days of the week. This leaves three days in each week for other work, including private study at home. This seems to me an example worthy of imitation in Scotland. It seems to me a matter deserving the serious attention of your Committee, and I apprehend that it will only be by the strongly expressed opinion of the General Council that we shall obtain the reform we stand in need of in this respect. As things are, our lecture system is a hindrance instead of an advantage to our students. In moderation, and confined to the elucidation of the higher principles of medical science and practice, lectures may be made highly useful. But to the extent they are carried, and embracing as they do the most elementary matters to be found in every text-book, I have long regarded them as a positive curse.

What adds to the evil is, that from the vast extension of every branch in these days, very few of the courses delivered are at all complete, while some teachers are in the habit of so varying their materials from year to year as to make two years requisite for the completion of their respective courses. In cases of this kind many students find that they have no help for it but to attend the same course twice, instead of once.

Another point, in view of the vast extension of each branch above referred to, it has become virtually impossible for any student to overtake them all in a manner at all satisfactory in a four years' course of study. It seems incumbent, therefore, that steps should be taken by the General Council to limit in some way the demands made on students by the examining boards, and to define those limits clearly. But this is too large a subject to go into to any good purpose, at the close of a letter already too long. Yet let me instance Chemistry as a subject that imperatively demands limitation, as also Botany, Natural History, and Forensic Medicine.

Dr. F. W. HEADLAND, *London*.

I feel very strongly the inefficiency of our present method of teaching the three subjects which you have mentioned. This method is to lump into one these three subjects, under the title of "Materia Medica and Therapeutics," and to teach them, or attempt to teach them, in one successive course of thirty-six to forty lectures. These lectures used, as you are aware, to be given in the winter, thus allowing twice the time which is now given. I do not think this at all too much, and if four years are now to be allotted to the course of medical study, I think some consideration should be given to what appear to me the paramount claims of the professor of this branch of the science of healing. When it is considered that all the other teachers put together are more or less occupied with the history of disease, it seems an anomaly that the history of cure, which is at least of as much importance to ourselves and our patients, should be confined to one-twentieth part of the whole curriculum. To judge from my own experience, it is difficult to give anything like a satisfactory account of the natural history of drugs in a summer course. I find that I have to conclude my lectures without even entering on the special consideration of the subject of Therapeutics. I am of opinion that a second summer course should be devoted to the action of medicines and their uses in treatment. As for the compounding of drugs—Practical Pharmacy—it should, I think, be taught in a short course of demonstrations by the hospital dispenser, under the superintendence of the professor, and coexistently with the first summer course—that on Materia Medica. The second course—that of Therapeutics—might be accompanied by a similar series of clinical illustrations, it being understood, as I think it should be, that the lecturer on Materia Medica and Therapeutics is one of the physicians of the hospital attached to the school.

The way to all this might be smoothed, and our duties and responsibilities much simplified, if a reform were carried out in our system of medical training which I have long felt to be necessary. It is the complete elimination from the medical course of the sciences of Botany and Chemistry. In the present day these should form part of the common education of a gentleman. I have found among medical students a very general ignorance in these two branches of study, and I attribute it to the almost exclusive claims which studies with a more immediate practical bearing possess in their eyes. I would venture to propose that Botany and Chemistry should be relegated to the preliminary training, and a certain proficiency in them be made a *sine quâ non* of the entrance on courses, which would be then exclusively "medical." This would give us more time for teaching the history of the human body, the disorders to which it is liable, and the method

of solacing them, enforcing each lesson, as we go on, by some practical example.

I have given as briefly as I can my views on this matter, which I may further sum up and particularize as follows:—

1. Materia Medica, or the natural history of drugs, requires at least one summer course of lectures. It should be given in the first summer session. A previous acquaintance with Chemistry and Botany should be supposed in the student; and the drugs themselves should be exhibited, and made the texts of the discourse.

2. Coexistently with this first course, demonstrations of Practical Pharmacy should be made by the hospital dispenser, or some other competent person. Attendance on these should be made obligatory. They should be purely practical, and in illustration of the principles explained by the professor.

3. Therapeutics (the actions and uses of medicines—no connection with the general and particular treatment of diseases) should form the subject of another course in the second summer, or, if more convenient, a half course in the second or third winter sessions. This science has so wide a range that I do not think it possible to do justice to it in less time than this. As the teaching of Materia Medica should be accompanied with pharmaceutical demonstrations, so the course on Therapeutics should be supplemented with pointed illustrations of the employment of remedies in different cases of actual disease. It is desirable that the lecturer on Therapeutics should be the same as hewho teaches Materia Medica. It is important that he be one of the physicians of the hospital attached to the school. While one of its physicians teaches Medicine, or the history of disease, another should lecture on Materia Medica and Therapeutics, or the history of cure.

Dr. DOUGLAS MACLAGAN, *Edinburgh.*

Question 1.

A course of Materia Medica ought to embrace a succinct account of the natural history, and physical, chemical, and medicinal properties of drugs, including their adulterations and officinal preparations; and the same instructor ought to teach the principles of Dietetics, the application of dietetical rules, and, as far as possible, also the effects of clothing, bathing, air, and exercise in the treatment of disease. Above all, this course of instruction ought to embrace a discussion of the principles of Therapeutics—the *modus operandi* of all the agents employed in the treatment of disease, whether these be dietetical, regimenal, or pharmaceutical. Practical Pharmacy cannot be taught by lectures, and is to be learned in the laboratory of an hospital, dispensary, or duly qualified Pharmaceutical Chemist.

Question 2.

Three months are too few for a proper course of lectures on this subject; but four months would suffice if the descriptive pharmacology were kept within proper limits. I refer to my replies on the subject of Forensic Medicine for an expression of my opinion as to the desirableness of four-months' courses of lectures, and of the alternative arrangement by means of which a three-months' course would suffice, Dietetics and Regimen being taught in a course of Hygiene, and the teacher of Materia Medica having to deal only with Medicinal Substances and General Therapeutics.

If this course were made either of four or three months' duration, it might be taken in the second summer, after the student has attended Botany, Natural History, Chemistry, Anatomy and Physiology; but if the whole subjects of Medicinal Substances, General Therapeutics, Diet and Regimen, are to be given in one course six months are necessary. It ought in this case to be taken in the third winter.

Question 3.

It ought to be taught by lectures, illustrated by a good collection of medicinal substances, and by such chemical and microscopical demonstrations as are required for showing the chemical and physical qualities of drugs. A proper chemical laboratory is indispensable.

Dr. SYDNEY RINGER, *London*.

It appears to me highly desirable that Materia Medica and Practical Pharmacy should be separated from Therapeutics, and these two subjects be taught at different periods of the four years of medical education.

Materia Medica and Practical Pharmacy can best be taught in the first year of education, and the teaching of these subjects should be carried on at the same time with the class of Practical Chemistry and Botany.

Materia Medica and Pharmacy can best be taught by demonstration and frequent examination.

In teaching Materia Medica a specimen of each drug lectured on should be in the way of every student, that he may see for himself the qualities of the drug described in the lecture. In the examinations specimens should be used for the students to describe; in fact, every step of the education should be of as practical a nature as possible, as by no other means is it possible for the students to recollect what is taught them.

Therapeutics should be taught at the end of the four years, when the student has acquired some knowledge of Medicine and Pathology.

These lectures should be as comprehensive as possible, and not too

numerous; and Therapeuties should also be ehiefly taught by demonstration in the out-patients' room and in the wards of the hospital, as it is by such means only that the minute details concerning the way to employ medicine, and the exaet eonditions of disease in whieh they are applieable can be comprehended and recolleeted.

Even this should be done as far as possible in an examinational form. For instance, the students should, in the hearing of the teacher, be made to give to the patient exaet and definite direetions as to the time and mode, &c., of taking the medicine.

By such a course of teaching the student can witness for himself the truth or otherwise of the teaching given him, and he will be much more impressed and more likely to remember the information given him.

The chief drawbaek to this method is that the teacher cannot very well manage a class consisting of more than twelve, and hence the working staff of the hospital must, if this system were adopted, be very eonsiderably increased.

This, however, would be an advantage, if the senior and better informed students were in this way employed.

Concerning the larger question of medieal education in general, I may state the present system does not appear to me to be the best adapted for making sound praetieal medical men—surely the sole objeet of their studies in the medical schools.

It appears to me each teacher thinks his own subjeet of far too much importance, and requires by some regulation to be restrained. Each feels it his duty to make his hearers as nearly perfeet in the subject he teaehes as possible.

I think, while it is desirable in a college like our own (University College, London) that a thorough course in each subject should be given, that those who wish may perfeet as far as possible their knowledge, a mueh shorter one should be given, which should have for its end the teaching of that part of the subjeet whieh will be required by the medical man when he is engaged in the duties of his profession. That all such instruetions should be as practical as possible, and be conducted in the form of demonstration, or the student should be made to perform the processes himself, as in Chemistry. In these last remarks it is Chemistry to whieh I ehiefly refer.

Scientifie men appear to think that Physies and Chemistry eomprehend the whole of Medieine; nay, if a man is well grounded in these subjeets he is fitted to perform the whole duties of life.

I think if students were compelled to read, and were examined in their classes in what they had read, the time of the teaeher would be better employed than in giving a long eourse of leetures.

The diffieulty in this method is the want of books treating eoneisely and shortly of the different subjeets of the medical eourse.

If each teacher would write such a book, and then, after a short lecture with full demonstration, examine the students, far more would be accomplished than by the present system.

In conclusion, I may add my belief that the University of London, by the form of the examinations and the nature of the questions which are given, is doing its best to ruin the teaching in the London schools, and convert the student into a learned theorist instead of a practical medical man.

I may add, that of course lectures are better than imperfectly conducted demonstrations, and if any such plan as recommended were adopted, stringent rules would be necessary to prevent both teacher and student shirking his work, or doing it in a slovenly way.

Dr. SIEVEKING, *London.*

I beg to acknowledge the receipt of two circulars inviting an expression of my opinions on certain points connected with Medical Education, and more especially—

1. On the subject of Materia Medica, Practical Pharmacy, and Therapeutics, and
2. On Medicine and Clinical Medicine.

I am obliged to you for giving me this opportunity, and beg to apologize if my remarks may assume too dogmatic a form or appear too lengthy. I recognize the extreme importance of the entire question of Medical Education, and feel strongly that if we are all agreed as to certain broad principles, it will be necessary in many instances for the individual to relinquish minor features of his own scheme in order to secure a common working plan upon which all may be agreed. Unanimity as to principles moreover does not necessitate absolute uniformity in details.

Permit me, in the first instance, to express my complete adhesion to the proposal, that four entire years should be given to the medical curriculum. This is the more necessary as the student now ordinarily comes to a medical school without any previous knowledge of professional matters; it is also requisite, for the same reason, that every security should exist for the more thoroughly practical character of all instruction to be given. In former times the apprentice system, however injurious to the scientific and social position of the medical man, had the advantage of imparting a practical acquaintance with drugs, with the minor operations of Surgery, and the domestic requirements of Therapeutics, and thus conferring upon the young practitioner self-reliance, which the present system of teaching is not calculated to supply. Although I am willing to admit that the apprentice

system offered certain advantages, I do not wish to revive it. I have always strenuously opposed it; but while we have supplanted it by what must be regarded as a better scheme of education, it will be wise to ascertain whether we cannot make such changes in our present teaching, as to secure for the public a supply of medical men, who, on leaving the schools, are at once more competent to undertake active duties than they have been of late years. A scheme of Medical Education, to be perfect, should undoubtedly secure a high average result; but Examiners ought not to strain at more than an average. The benefit to society should not be lost sight of in the ambition of a school to produce an exceptionally high class of men. Unusual perseverance or talent may be left to itself. Teachers and Examiners have rather to consider the *mediocriter docti*, than those who are able by native power or extraordinary industry to overcome all obstacles. While, therefore, I would strongly urge that theory be not lost sight of, I would not infuse into ordinary teaching more of it than is likely to lead to the satisfactory and effective realization of the practical objects of our profession.

The tendency of the present system appears to me to be too much in the direction of theory, to the detriment of Practical Medicine.

After these preliminary remarks, which I venture to offer as indicating the principles I hold, I proceed to consider the subjects of "Materia Medica, Practical Pharmacy, and Therapeutics."

My experience in teaching this discipline, now of fifteen years' duration, convinces me that the usual course of three months is inadequate for the purpose of teaching the subjects included under the above heading. I enclose a copy of my last syllabus, which, *mutatis mutandis*, is the same that I have used during my whole tenure of office. It shows the large range of subjects which I conceive to come under the above denomination. I fear I shall be accused of inconsistency, when it is observed that I have introduced, as a part of the course, the subject of hygiene and regimen: but from the first I have thought it my duty to seize the opportunity of impressing upon the student, that the cure of disease does not depend upon the employment of drugs alone; that they in fact often form but a minor part of the appliances at our command in the treatment of disease, and in the preservation of health. A great deal of modern scepticism is due, in my opinion, to the exclusive attention devoted by lecturers on Materia Medica to drugs. My faith in the *Pharmacopœia* has increased since my schooldays, and since I have learnt the full scope of hygienic appliances, and the proper position that the contents of the *Pharmacopœia* ought to occupy, I do not think I owe my convictions on that score to my teachers. I have wished to save my pupils from my own former scepticism; but I have done my part under the compulsion of College Regulations, and am free to admit that a great change is necessary. The plan that I would propose is this, that the subjects

now treated in the first Summer Session be spread over two Summer Sessions. In the first, when the student is fresh from the chemical theatre, and is still working in the laboratory, he should attend a short demonstrative course of not more than two hours a week, in which he should be taught the physical and chemical properties of the drugs only; this should be done tutorially, without set lectures, but the student should see, taste, and handle the drugs. At the same time, I should require him to devote an hour daily, in the hospital dispensary, to Practical Pharmacy, and I conceive that the same officer who superintends the one course would be best calculated to discharge the duties of the other. This would necessitate the appointment of extra skilled assistants in the dispensary, as well as a better arrangement than generally prevails in English hospitals in this department. Some of the modern French hospitals that I visited last year contrast most favourably, in regard to cleanliness, light, air, and roominess, with our own. I confess I returned to town with a heavy heart when I had instituted the comparison. Without important reforms in this department, our hospitals cannot achieve all that they may be expected to do, in the way of tuition.

When the student has acquired a knowledge of the names, and the chemical and natural historical character of the drugs, he will be prepared to receive instruction as to their therapeutic value; and into this part of the course, diet and regimen ought to be introduced as an integral constituent. By the time the student attends the second division of the course, which I would place in the second Summer Session, he ought to have become familiar with the nomenclature of disease, and have attended a course of Theoretical Medicine or Nosology. Certainly he will be better fitted to appreciate the various topics that properly may be included under the head of Therapeutics. (diet, clothing, regimen, ~~selvcology~~, climatology, and the balneology and the employment of drugs) when he has breathed a medical atmosphere for a twelvemonth, and has acquired the a. b. c. of Anatomy, Physiology, and Pharmacy, than he is now. Although I can speak of an amount of success gained by my students at examinations not below the average, still, the process of teaching has not imbued me with a strong conviction of the attention and assiduity of the average student in the Materia Medica class; and I think this may in a great measure be attributed to the system which compels the lecturer to discuss many points, for which the previous education of the student does not yet fit him. But, if at the outset of his career he has been rendered familiar with the raw material to be employed, more scientific doctrines regarding its application will be better appreciated at a subsequent period of his curriculum. The only question that suggests itself here is, as to whether the Therapeutical part of the course may not be advantageously deferred till the third Summer Session. This I should be willing to accede to, if, by this method, the general system of tuition were advanced: but assuming a plan adopted such as I have sketched, I should deem it a decided

disadvantage to delay this course until the fourth summer, when clinical study and its accessories ought to occupy the entire time of the student. He ought not on any account to be entrusted with the management of any patients, until he has passed through this part of his curriculum, and has acquired a good preliminary knowledge of Materia Medica, Pharmacy, and Therapeutics. In fine, I would advise that the outlines of Materia Medica and Practical Pharmacy be taught in the first Summer Session; that Therapeutics be reserved for the second Summer Session, and that the student be required to pass an examination in all subjects taught during the first two years of his course at one of the Colleges.

MEDICINE AND CLINICAL MEDICINE.

NAMES OF GENTLEMEN WHOSE REPLIES FOLLOW.

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REPLIES.

Dr. W. AITKEN, *Royal Victoria Hospital, Netley.*

I have the honour to acknowledge the receipt of your letter of the 5th of August, 1868, requesting "the expression of my opinion" on three points relating to the teaching of Medicine and Clinical Medicine, namely :—

1. "The topics which may most advantageously be included under the subject of Medicine and Clinical Medicine."
2. "The period in a four years' course when they can be most profitably studied, and the length of time which should be devoted to them."
3. "The manner in which they can best be taught—by lectures, practical instruction, or otherwise."

It gives me much pleasure to comply with the request of the Committee of the Medical Council; and to send you the following expression of my opinion,—having regard to three considerations, namely :—

1. That the period of four years is fixed as the time recommended by the Medical Council to be devoted to the study (practical and theoretical) of the ten subjects named by the Council as "necessary to enable students to obtain the requisite knowledge and skill for the efficient practice of their profession."
2. That the provisions, arrangements, or opportunities for each individual student of Medicine obtaining for himself any practical skill (as by being a dresser, or a resident clinical attendant) in the wards of an hospital, have been during the past twenty years, and still are, limited and few, compared with the number of students of Medicine.
3. That (rightly or wrongly) during the past twenty years apprenticeships have been discouraged, and are now virtually abolished, even in their most modified forms; so that the special technical details of medical science which a good and well-used period of apprenticeship is acknowledged to have been capable of supplying, are no longer to be learned from apprenticeships.

From experience I am bound to maintain that the advantages of an apprenticeship (under certain conditions) were great and numerous as a means of acquiring some use of the hands, at least, for example, in dental surgery, bandaging limbs or fingers, in the dressing and treatment of simple wounds

ulcers, and injuries, in the practice of cupping, bleeding, catheterism, administration of clysters, the use of the stomach-pump in cases of poisoning, the applications of dressings, of turpentine and mustard. The apprentice also acquired some knowledge of the appearances and treatment of venereal sores and of gonorrhœa ; also skin diseases, children's ailments, and vaccination. He learned also the compounding of drugs, the administration of medicines, with opportunities for watching their effects. The names of diseases and their symptoms were also learned. Definitions of the more common diseases were arrived at from the experience of watching their progress and termination. Thus an extensive familiarity with the names and general nature of things medical were almost intuitively and gradually acquired, to an extent in some measure proportionate to the industry, intelligence and earnestness of the apprentice in the vocation he voluntarily adopted, and his natural aptitude and fitness for the study of Medicine.

Very few now enter into indentures of apprenticeship, and the modified form under which apprenticeships are permitted is simply an evasion of any legal indenture. Practically, therefore, apprenticeships are now useless as a mode of teaching Medicine and Clinical Medicine.

Looking, therefore, to the importance of these three considerations, the principles upon which the various subjects of medical education which have been deemed requisite by the Council, may be taught with most advantage, demand or imply :—

(1.) Economy of time, so that as much of extent and detail of subjects taught may be compressed within specified limits.

(2.) An extension of facilities for bringing each individual student within reach or opportunity of acquiring for himself some practical skill in the several branches he is called upon to study. Little if any change has been made in the methods of teaching Medicine and Clinical Medicine during the past twenty years, while the scope of the subjects have very greatly extended especially in the means and appliances for the diagnosis of disease.

(3.) The special technical details which a good apprenticeship is acknowledged to have been capable of teaching, but which by the abolition of such apprenticeship can no longer be so acquired. It behoves the teaching throughout the medical schools to be of such a kind (in every separate branch of study, and more especially in Medicine and Clinical Medicine) as to embrace every individual student, so as to supply to him in a much better form the advantages of an apprenticeship, without its disadvantages.

The methods of teaching throughout every one of the ten subjects ought to be :—

(1.) More practical and more elementary than during the past twenty years,—*i.e.* more tutorial in its methods, proceeding from particulars to generals, and less of formal or systematic lectures.

(2.) Such kind of teaching also implies more extensive (and, therefore,

perhaps, more expensive) arrangements and plant to be provided by schools and hospitals for the individual practical instruction of the pupil. This is especially necessary in the teaching of Medicine and Clinical Medicine, so as to secure the maximum of competent instruction and experience in the physical examination of living persons, and in the study of Morbid Anatomy and Pathology.

With these preliminary statements of opinion, I venture to submit the following scheme, merely as an outline of topics for the minimum instruction in Medicine and Clinical Medicine. The periods and, in some measure, the methods of instruction are also indicated. Such instruction, it is assumed, can only be supplied when abundance of practical work can be combined with carefully organized tutorial and systematic clinical instruction, as from the utilization of hospital patients, as well out-door as in-door, in our large metropolitan and also in adequate provincial hospitals.

OUTLINE SCHEME OF INSTRUCTION IN MEDICINE AND CLINICAL MEDICINE.

The Winter and Summer Sessions, whether divided into five winter months and four summer months, or into six winter months and three summer months, should yield, at least, five days work in each week, of not less than six hours daily, during nine months of the year=thirty-six weeks of 180 working days.

During the third year the topics included under the subject of Medicine and Clinical Medicine ought to be studied; and they ought to occupy half the time of the whole period; and as much of the fourth year as can be got, having due regard to the requirements of Surgery, Midwifery, Forensic Medicine.

A. *Systematic Instruction.*

October to middle of November, a course of six or eight weeks, *i.e.* thirty or forty, making one hour daily.

I. Elementary instruction in Systematic Nosology, embracing:—

(*a.*) Definitions of medical terms.

(*b.*) Nomenclature and definitions of the more common and typical diseases.

(*c.*) An elementary description of the symptoms and nature of these diseases.

Some agreement ought to obtain as to the uniform selection of topics, which may best be obtained by agreeing to use as a text-book "The New Nomenclature of the Royal College of Physicians of London," supplemented by the use of a dictionary of medical terms.

The definitions of diseases should be written out at the dictation of the tutor, and ought to be committed to memory by the student.

This course would be introductory to the more systematic lectures on Medicine; and the progress of the pupil ought to be tested by weekly written examinations in the class room. Such kind of test examination also giving facility in writing and spelling the names of diseases and of medical terms.

Middle of November to end of the Summer Session—a course of twenty-eight or thirty weeks, *i.e.* 140 or 150 meetings, one hour daily.

II. Formal systematic lectures on the science and practice of Medicine, embracing an account of the most important and generally accepted facts and doctrines in Pathology.

The chief tests of progress would be by compulsory written examinations, at the end of every month, or as often as may be found beneficial and most stimulating to the exertions of the students according to the experience of the teacher. Such written examination ought not to occupy more than one hour (to count as a lecture). Thus the teacher learns by these written examinations the mental condition of each student as to his knowledge of the subjects taught, and the progress or the reverse made from time to time. The reading of such papers is undoubtedly irksome, but it is a duty, and need not entail much time or labour, unless the papers were to be arranged in order of merit.

Aid might be obtained in this work from advanced students who are competent, and who, not pushing through in the prescribed term of four years, may have time to act as tutors.

Another stimulus to work is obtained by making one student exchange his written papers with another, and so mutually to correct the errors of each, the corrections so made to be approved of or disapproved of by their teacher.

B. *Practical and Demonstrative courses of Instruction.*

October to middle of November, a course of six or eight weeks, *i.e.* thirty or forty meetings, two hours daily.

I. Elementary practical work by the pupils, and demonstrations by the teachers.

This course is intended to be introductory and preliminary to any clinical ward-work in an hospital.

The manner in which this course could be best taught would be in classes where each pupil did all the work himself, directed and superintended by competent tutors, in a suitable room where the necessary means, appliances, and apparatus would be provided for each.

A strong deal table at least four feet square, with a cupboard and drawer should be provided for each pupil; and there should be at least one teacher to not more than thirty pupils, assisted by, say, five pupil teachers selected from advanced students as are competent and not pushing forward to finish in four years. Such men might look forward to becoming teachers, and would be thus qualifying themselves for teaching.

Before the pupil enters the wards of an hospital for the study of diseases he ought to have not only learned but to have performed for himself every practical detail comprehended in the following topics; and he ought to be certified by his teacher, as having done so before he is permitted to enter the clinical wards.

The object of this practical course should be to enable each pupil to master the rudiments of physical examinations conducted on healthy persons, as preliminary to similar examinations in the clinical wards on sick people.

The advantages of such a course of instruction are twofold, namely, (1.) To learn the uses and the application of the various instruments necessary for the investigation of disease. It is to the want of such instruction and experience that enough is not made of the application of such instruments. (2.) To learn by actual experience what existing conditions are to be regarded as normal, and so furnish each student with a standard for future comparison when he examines morbid conditions of organs in the clinical wards of an hospital.

[It may come to be a question for settlement how far the subjects proposed to be taught in this course ought not to be taught under Practical Physiology; but until that is decided, the topics are those pertaining to, and elementary of clinical instruction, and otherwise they are nowhere provided for at present.]

As uniform a system of instruction as possible should be followed by all teachers; and each pupil should be made to record his daily results, in a case book, similar in principle to the case-book which he will have to use in the clinical wards for recording cases of disease.

The course ought to embrace a record by each pupil of the existing condition and limits of each organ or system of organs. The examination and records may be taken in any order most convenient, but should embrace the topics contained in the following list, which may easily be arranged into lessons for the day at the discretion of the teacher.

DETAIL OF TOPICS OF INSTRUCTION IN THE ELEMENTARY PRACTICAL COURSES (two hours daily) for six or eight weeks—*i.e.* thirty or forty meetings.

Practice in defining or mapping out the regions of the thorax, and in stating the contents of each organ so defined, and their relations to the walls of the thorax, and to each other.

Instruction and practice in the use of outline figures for indicating regions or areas of physical signs.

Situation of the organs in the thorax. Outer and inner boundaries of each lung. Position of the apices, and indications of changes in the positions of the lungs.

Measurements of the thorax, to learn the range of its deficiency as to symmetry. Accurate measurements to be made by callipers and measuring tapes, stethometers, or chest-measurers. Extent of chest expansion.

Physical examination of the chest on a uniform method, so as to be exhaustive.

Simple inspection to note—

(*a.*) General shape, depth, height, and breadth of shoulders.

(*b.*) Capacity or size to be noted in relation to age, weight, and height. [Provision and arrangements to be made for weighing and measure.]

(*c.*) Thoracic movements to be noted, so as to determine the number of respirations per minute, and their relation to age, sex, posture, and time of the day to be expounded.

(*d.*) Expansion of chest to be noted as determined by measurements at full inspiration and complete expiration.

(*e.*) Plans for ascertaining the capacity of the lungs—*e.g.* by length of time taken to empty the chest by counting aloud after a full inspiration; also of the use of Hutchinson's spirometer.

Palpitation.—Appreciation of "pemitus," and of the action of the heart; position where it is felt to beat.

Percussion.—Use of finger and of percussion hammer, mediately and immediately; different modes of percussing; recognition of the healthy pulmonary percussion note; qualities of sound to be appreciated if possible, such as clearness, duration, pitch, and volume of sounds; also tympanistic sounds.

Auscultation.—Uses of stethoscopes of various forms. Definitions and appreciation of the thoracic sounds, and of those of the voice heard in health.

Relations of the different parts of the heart (especially its apex, valves, and orifices), and of the great blood vessels to fixed points upon the walls or surface of the thorax.

Practice in defining the outlines of the heart (in outline figures) from percussion; defining the lines of the base of the heart, the regions of its superficial dulness, and the præcendial region; the limits of the line of the base of the ventricles; point of impulse of apex as determined by palpitation; length of ventricular portion.

Similar definitions of the limits of the auricles.

Relative position of the orifices of the heart, and of the valves, and of the aorta. Relative dimensions of the orifices to be learned.

Systematic methods of examination into the existing condition of the heart.

Auscultation of the heart; sounds of the heart, their differences and duration. Define limits of surface over which they are heard, points of greatest intensity, appreciation of rhythm. Practice in defining the lines of transmission and propagation of sound.

Experience in counting the beats of the pulse, noting the number, force, quickness, regularity, in relation to the heart's contractions. Precautions necessary in counting the pulse in adults, children, and infants; also in relation to age, sex, temperament, posture, period of the day, relation to respirations.

Uses and application of sphygmograph. Modes of applying it to the artery.

Method of recording a "pulse tracing" by the sphygmograph. How arterial tension, or feeble pressure, may be measured. How the sphygmograph indicates the force and arterial resistance of the pulse.

Practice in examining the mouth, fauces, pharynx, and larynx, using spatulas and laryngoscope; and describing the conditions of the parts exposed to view.

Examination of the several abdominal viscera in relation to the walls of the abdomen. Practice in defining or mapping out the regions and indicating the contents and limits of contained parts.

Practice in percussion to define the limits of the liver, spleen, kidneys.

Practice in the methods for determining the composition of the urine according to systematic details.

1. Age and weight of the person to be noted whose urine is examined.
2. Composition of urine to be determined from the whole amount collected during twenty-four hours.

[Each pupil may collect his own urine, and either examine it himself or exchange with another for mutual examination.]

Practice in noting the following general properties :—

(*a.*) Specific gravity.
(*b.*) Colour.
(*c.*) Clearness on examination and after rest.
(*d.*) Reaction with test paper.
(*e.*) Qualitative examination for albumen and sugar.

Volumetric determination of urea, uric acid, free acid, phosphoric acid, chloride of sodium, sulphuric acid, &c.

Determination of the solids.

Collection and examination of urine sediments by the microscope.

Exposition of the pathological relations of sediments and compositions.

Methods of inquiring into the conditions of the mental, sensorial, and motorial phenomena; special sensibility; condition of the sight and use of ophthalmoscope; smell, taste, touch, common sensation; use of callipers in the skin; differences of sensibility in different parts (æthenimetry).

Methods of applying Phillip's maximum thermometer to measure the temperature of the body. Methods of recording temperature in relation to pulse and respirations, and to urinary and other excreta.

Demonstrations and expositions by the teacher of the more elementary forms of disease by the aid of models, drawings of diseased conditions, and especially of cutaneous diseases.

Characters of morbid urine. Microscopic demonstrations of urinary deposits.

Demonstrations and explanations of the appearances of morbid sputa (obtained easily from hospital patients); microscopic elements of sputa typical of pneumonia, of gangrene of lung, of acute and plastic bronchitis, of acute phthisis.

It has been, and may still be, objected to by some that the use of many of the methods and instruments of investigation mentioned in the foregoing outline is practically unnecessary or, at least, impossible in the daily routine of general practice. But, for a student of Medicine, I am strongly of opinion that a practical knowledge of the uses and applications of all such instruments is indispensable in aiding him to obtain the requisite knowledge and skill for the efficient practice of his profession.

Their use imparts a certainty to his observations which is not otherwise attainable, and he learns by their aid to follow and appreciate more completely the natural history of diseases. Such instruments are, therefore, necessary aids in all well-conducted clinical teaching. The information and experience they convey to the student, when he is a student, is of such a kind that in the ordinary cases met with in general practice he is able to dispense with their aid to some extent, while their usefulness in obscure cases can only be thoroughly estimated by those who have made a systematic study of their uses and applications.

A. *Practical Clinical Course.*

Middle of November to end of Summer Session—a course of twenty-eight or thirty weeks—*i.e.* 140 or 150 meetings, two hours daily.

I. Clinical ward-work in hospitals.

(*a.*) The teaching to embrace the use of case-books on a uniform plan, for recording the condition of each patient. Each pupil ought to have the charge of as many patients as may be convenient. A tutor or clinical teacher (as at Guy's, King's College, and University Hospitals) should superintend not more than twenty pupils and the

cases in their charge, seeing that the case-books are properly kept and the cases completely and exhaustively examined and diagnosed.

(*b.*) A clinical lecture to be given by the professor of Clinical Medicine once a week or once a fortnight.

The more common the discourse the more instructive may be the lecture, especially if cases are brought direct from the waiting-room and interrogated *ab initio*.

II. Instruction (practical) in Morbid Anatomy.

(*a.*) A meeting once a week (twenty-eight or thirty meetings) or once daily with different sets of men, according to the accommodation and the numbers attending the school, for the practical study of Morbid Anatomy.

Two hours at a meeting is necessary to do justice to such a course, in order to acquire a practical acquaintance with the appearances and characters of diseased tissues, which may be placed before him for examination.

Assuming that in the courses of Anatomy or Physiology the student has practically learned to prepare, and knows the appearances of, the normal tissues and organs, microscopically and otherwise, he is prepared to learn Morbid Anatomy practically in the same way.

The course should be conducted in classes of limited numbers—say 30 or 40 in a class—with the aid of three or four pupil teachers, the pathologist to the hospital, who conducts the *post-mortem* examinations, being the proper person to teach this course.

(*b.*) Attendance on *post-mortem* examinations.

All clinical hospital pupils in Medicine and in Surgery should be obliged to attend the *post-mortem* examinations. The professors of Clinical Medicine and Surgery might arrange to give, each, an hour common to their courses for this common object. Two students, different at each *post-mortem*, should be told off to do the manipulation of opening and eviscerating the cavities of the body; a third student should note the records at the dictation of the pathologist, who examines each organ and reports or describes its morbid condition in their order as laid before him.

The *post-mortem* examinations ought to be made on a uniform plan.

At the end of the course, the attention of the student to these examinations can be tested by requesting a written account of some one of the *post-mortem* examinations made during the course. Some case of more than usual interest could be selected, of which few students who were present, would fail to be able to give some account.

At Netley I found that complete attendance was, with some difficulty secured at *post-mortem* examinations, till such examinations were instituted. Since that time there is not only complete attendance, but close attention and independent note-taking at every *post-mortem* examination.

The following is an example of the test-examination on this subject at Netley :—

"(3.) Describe the prominent lesions seen at the *post-mortem* examination of Lance Corporal Jos. Gillies, who died July 12th, 1865, and whose body was examined on the following day. He had completed ten years of service, and had served in Malta one year, in Bengal eight years, and the remaining period in England. He had suffered from ophthalmia at Malta, from erysipelas and remittent fever in Bengal, followed by ulcers on the legs, for which he was invalided, after suffering from them for five years. These ulcers occasionally healed up.

"He was admitted into this hospital on June 27th, 1865, with open ulcers on the lower extremities, and on the 2nd July (the fifth day after admission), he was seized with shivering. Two days after this shivering, he complained of pain on micturation, and great pains referred to the perinæum. He passed his urine with difficulty. There was no history of stricture. The urine passed was turbid, and contained both pus and albumen. The symptoms during the termination of the case, indicated septicæmia, with evidence of an abscess in the region of the neck of the bladder. The case terminated fatally on the 12th July, ten days after the shivering.

"The points requiring your attention are as follows :—

"What were the nature and condition of the ulcers?

"What the condition of the femoral veins?

"Of each kidney?

"Of the bladder and surrounding parts? and

"Of the lungs and pulmonary vessels?

"And lastly, give an account of the pathology of the case, the probable immediate cause of death, and connect the lesions seen in *post-mortem* examination, with the indications of disease during life."

Fourth Year of Study.

During the fourth year extensive use ought to be made of the out-patient department of the hospital, somewhat on the same plan as I remember to have seen in operation in the dispensary practice of Edinburgh.

Organization is very much required in the administration of out-patient work at the hospitals.

There ought to be a great many more physicians and surgeons appointed to attend on the patients in this department; and by a classification of patients and the aid of pupil-teachers, as many as fifteen to twenty students might be in charge of each physician, aided by a pupil-teacher, who ought to be a qualified medical man. Vaccination ought to be taught at this time.

Clinical work in a Children's Hospital would be of use at this period, if it can be got.

Attendance in the clinical wards, and in the *post-mortem* room would also still be continued, but no class-work, or other than may suit the demands on the time of the student devoted necessarily to midwifery and other subjects.

Dr. LIONEL S. BEALE, F.R.S., *London.*

I beg to forward the following observations on the subjects of (1.) Anatomy and Physiology,* and (2.) Medicine and Clinical Medicine, submitted to me by the Committee of which you are the Chairman, and shall be happy to enter into further particulars should the Committee desire me to do so.

With reference to the examinations, there appears to me very considerable difficulty, in consequence of the arrangements and vested interests of the various existing corporations and examining bodies. It appears to me that what is really required is, the formation of an entirely new board of examiners for the whole country—a sort of state examination, compulsory for every one who enters the profession. If competent examiners were appointed for short periods of time only (say five years), and rendered ineligible for the same examinership until at least five years more had elapsed, everything else would, in my opinion, right itself. All other legislation on medical education would, I think, be rendered unnecessary. There need be no registration, compulsory attendance on lectures, &c. The examinations might take place once or twice in the year, and consist of several successive steps, no student being permitted to present himself for the second examination until he had passed the first, and so on.

I hope it will not be thought that I am an advocate for over-educating medical students. My strong impression is that now the average student is much under-educated. I think that if a better system were pursued, the average student would acquire, in the same time, at least five times the amount of information which he now gains, and his knowledge would be also more exact, more extended, more useful, and more practical.

Medicine and Clinical Medicine.

1. Under the head of Medicine should, I think, be included lectures on Hygiene and State Medicine, as well as the geographical distribution of disease. The course of lectures on Medicine should be systematically arranged, and should include a general exposition of the whole subject. Clinical Medicine should include comments on individual cases by the physician, case-taking by the student himself in the wards, Medical Chemistry and microscopic examinations of the various secretions and excretions, and information on a number of subjects connected with medical work, which each individual teacher might give, but which could not be acquired from books.

2. I do not think that any hospital work should be commenced until after the completion of the second year, and the student has passed his examinations on Anatomy, General Anatomy, Chemistry, Materia Medica, and Practical Pharmacy.

* *Vide* section on Anatomy and Physiology, page 42.

Ever since I have been a teacher I have found it impossible really to teach by the bed-side, in consequence of the utter ignorance of many of the men on elementary matters. For example, on asking a man to diagnose a case of mitral disease, one finds he does not know the ordinary anatomy of the heart and mode of action of its valves. Surely in this case the teacher should have the power of sending him back to the dissecting-room for a time, and keeping him out of the hospital. Finding urine loaded with urates in a case of fever, one asks one or two questions, and discovers that the student does not know the difference between urates and phosphates, or how to distinguish them—knows nothing about the reaction or specific gravity of urine, practically or theoretically. In a case of pulmonary emphysema, the student is found to be ignorant of the general anatomy of the lung, as to the arrangement of the air cells, vessels, &c. In a case of kidney disease, some are ignorant of the anatomy of the organ, and know nothing about the circulation through it, and so on—ignorance of first principles preventing any real teaching at the bed-side except to the intelligent men, amounting probably to less than 10 or 15 per cent. of the whole school. I doubt if 30 per cent. of those who obtain the ordinary licences to practise would be able to diagnose an ordinary case of heart, lung, liver, or kidney disease, or to give a fair general account of the state of the diseased organs; and I fear that 50 per cent., or more, would not know how to set to work to investigate a complex case of disease, such as often occurs in actual practice.

Dr. WARBURTON BEGBIE, *Edinburgh.*

These subjects should as much as possible be taught simultaneously, and by the same teacher. Thus the teacher of Medicine by systematic lectures will possess the great advantage of illustrating them by a reference to diseases as they actually occur, while the method of treatment will be observed and canvassed by the students who are learning from him their earliest lessons in Therapeutics.

As the plan of study is at present arranged in almost every medical school, attendance upon lectures on Medicine and the study of Clinical Medicine should be commenced in the third Winter Session, and continued till the close of the student's attendance on prelections, and at hospital.

I am an advocate for the student commencing his hospital attendance in his first session, feeling convinced that no injury to his other studies, but, on the contrary, a great gain in every way results from this practice.

I take the liberty of directing the attention of the Committee to observations on this subject contained in an "Introductory Address," at the com-

mencement of the session 1863–64.—*Edinburgh Medical Journal*, December, 1863.

In systematic lectures on Medicine (practice of Physic) it seems chiefly desirable to discuss the principles—those particulars which lie at the foundation of all scientific or reasonable practice—of Medicine. Under this will, of course, be embraced the recognition of disease in the living body (Diagnosis), the consideration of the progress of disease, the events likely to occur in its course, and its probable termination (Prognosis); the changes produced by disease, and their probable causes of whatever nature, whether external or internal (Pathology, including Morbid Anatomy); finally, the treatment of disease (Therapeutics, including medicinal agents, diet, regimen, climate, &c.) In directing the student's attention to these principles it becomes unnecessary and would be disadvantageous for the teacher to go over the whole field of the practice of Medicine, were that, indeed, a possible task in one hundred lectures. Certain diseases or classes of disease should be selected for the purpose of giving an ample illustration to these principles.

In Clinical Medicine the students can alone be efficiently instructed in the use of the various and now numerous, as well as valuable, aids to Diagnosis (microscopes, stethoscopes, &c., &c.) Clinical lectures should be strictly clinical—that is, observations on instances of disease occurring in the hospital, under the student's observation. It is in this particular study that the student can alone become familiarized with the appearances found upon dissection in fatal cases. As frequently as possible patients should be placed before the students in the class-room. I hold examinations in the class to be of primary importance. These examinations, to be of highest value should be undertaken by the teacher himself. Students not unfrequently remark that they receive more good from carefully conducted class examinations than from lectures.

The teacher should diligently inquire into, and as fully as possible direct the private reading of the students. The indication of suitable works for reference and study is an important part of the function of a teacher.

In Practice of Medicine it is essential for the teacher to be provided with a museum of pathological specimens, while the possession of plates and delineations, of tables (statistical and otherwise), and reference to such, facilitates both the giver and the receiver of knowledge in the class-room.

I may conclude these remarks by stating that, in order to acquire a knowledge of the practice of Medicine, it is necessary for the student to attend systematic lectures; but that, in my opinion, the study of Clinical Medicine is of chief importance and of highest value. Anything, therefore, which can be done in the way of encouraging clinical studies, and more particularly in the way of lengthening the time devoted to them, will, I apprehend, directly tend to the improvement of medical education.

Dr. T. K. CHAMBERS, *London.*

In reply to your circular of August 5th, I beg to submit the following as the result of fourteen years' experience as a Lecturer on Medicine and Clinical Medicine, and as Examiner for the B.M. degree at Oxford, and Membership of the London College of Physicians.

1.—A. *Teaching of Medicine.*

The topics which, in the instruction of the average student, may be most advantageously included under this head, are—

(*a.*) The Causes of Disease.

(*b.*) General Pathology.

(*c.*) The Principles of Preventive Medicine (Hygiene and Climatology).

(*d.*) Special Pathology of Medical Diseases.

(*e.*) The Principles of Recovery, and General Therapeutics.

The teaching of Medicine and teaching of Surgery should include between them the whole of the etiology and general pathology of disease. On a fresh appointment to a chair, the teachers of these two subjects in each school ought to make a joint return of which parts they agree to undertake. This would avoid the waste of time which now arises from the repetition of many subjects common to both, such as inflammation, suppuration, cancer, &c. General Pathology being thus divided, more time could be given to the special pathology of such diseases as are at each school considered as medical. (I express myself thus, because at some school-hospitals certain ailments, such as those of the skin, or of the womb, for instance, are placed under the care of the Physicians, at others under that of the Surgeons.)

Under special medical diseases should be included mental diseases.

I think the details of treatment (special therapeutics) should be entered into most sparingly, and only by way of illustration, and then principally in the instance of such diseases as are not usually seen in the hospital.

1.—B. *Clinical Medicine.*

Under this head, what should be taught is—

1. The practical use of the eye, ear, and other senses in diagnosis, and the principles involved in the instruments of precision in common employment among physicians at the time being.

2. The analysis of excreta, chemical and microscopic.

3. Case-taking and investigation of history.

4. The details of treatment, dietetics, and nursing.

2. *Period of Pupilage, and length of time to be devoted to them.*

I think the *Principles of Medicine* may be without difficulty taught thus—in a course of forty discourses of an hour each, if the Lecturer will take care not to dawdle over pet subjects. The course should be attended during the third year, either in the Winter or Summer Session. I see no good, and much harm, in requiring a second course to be heard; for that plan encourages the pupil to procrastinate his attention to the matter before him, and affords an excuse for not enforcing strict attendance on lectures.

Clinical Medicine should be studied during the third and fourth year, and I think at least two hours three times a week during both Winter and Summer Session should be devoted to this subject under the immediate eye of the teacher or teachers.

3. *As to mode of Teaching.*

A.—The *Principles of Medicine* may be fairly taught by the usual professional lectures, if the hearers take notes and make them up afterwards. But I think much greater readiness in applying his knowledge would be given to the student if the theatre were made a "schola catechizationis," and previously-announced subjects were prepared from authorized text-books and made matter for question and running commentary. This would diminish the temptation to waste time in oratory, anecdote, and the parade of personal discoveries.

B.—*Clinical Medicine* should, in my opinion, be taught by an intimate association of personal inspection of patients with explanatory lectures. Every visit to the ward should be accompanied or followed by a familiar conversational discourse three times a week. It is a great advantage to have the class-room near the wards. During the third year I would require attendance and observation only; but during the fourth, I would enforce the rule that the pupil should have been for a certain period a clinical clerk or assistant to a physician, and that during the remainder of the year he should take notes of cases, to be verified by the physician in charge of the cases, and submitted to the examiner at his examination for licence to practise.* For these purposes, I think *out* as well as *in*-patients and their attendant physicians might be made available, and that in twelve months a student, of mental powers even below the average, might be made adroit in auscultation and other modes of examination, and become methodical in keeping notes and simplifying prescriptions.

For a model clinical class, the classic rule for a supper party seems to me

* They would be analogous to the log kept by midshipmen, a most efficient part of their education, and most helpful to the Examiners.

strictly applicable. With more than nine, general conversation is impossible, and personal influence difficult; with less than three, there is want of animation.

By "otherwise" in Question 3, I presume instruction by reading is intended. I think that for the ordinary student it requires limitation and direction, rather than encouragement. He has time for very little indeed, and that is best spent in preparing for lecture from authorized text-books. We have found it a good plan at St. Mary's for the Dean to give a short list of these to the students, and advise them not to buy more during their pupilage. And I think it possible that the Medical Council, aided perhaps by a Committee of Lecturers, might usefully employ their authority in issuing a similar list as a guide.

I mean the observations which I have the honour to submit to the Committee to apply to the education of a safe general practitioner. But I think also the same curriculum may form a good groundwork of preparation for the higher grade of Consulting Physician or Surgeon. I would require all to go through the same training up to that point before they enter on the higher studies; upon which, as I understand, the present inquiry is not made. I would simply say here that it is to these, and not to the ordinary student, that I would apply a design which I have joined in mooting in another place, of an union to throw open the wards of all the school-hospitals on payment of a single fee. I consider it more advantageous to the four years' pupil to remain under the eye of one set of teachers. And even of the sixth-year men I think it is decidedly beneficial to the juniors if some are kept attached to their school by a scheme of tutorage; for it is found at the English universities that pupils easiest learn from those who are only a few years their senior. Friendships would thus be formed on a professional basis, which might be of the greatest use to both minds.

Dr. E. CHARLTON, *Newcastle-on-Tyne.*

In reference to the questions proposed to me by the note of the Committee of the Medical Council, bearing date August 28, 1868, I beg to state that I consider that the two last years of the four now allotted for study should be devoted to Medicine, as medical practice forms a very large proportion of the work of the general practitioner. Of mere lecturing we have still, perhaps, rather too much; of Clinical Medicine and *vivâ voce* examination at the bed-side, still probably too little. For the last twelve years clinical lectures on Medicine have been given at the Newcastle Infirmary thrice, each of the

four physicians giving a course of six weeks during the winter. I cannot speak for the plan followed by my colleagues, but my custom is to work at the bed-side almost entirely, and to allot a case to each student on which he has to respond before the whole class. The responsibility thus incurred impresses the features of the case thoroughly upon the student. I find that he rarely forgets what he has then learned, while I have seen little benefit from abstract lectures on medical subjects, and still less from following the physician round the wards, without selecting individual cases for study. The lectures on Medicine are given here at the Medical College thrice a week. The examinations are not so frequent as I could wish them to be, but the amount of matter to be got through in a session of seventy lectures is far too great.

Sir HENRY COOPER, M.D., *Hull.*

In reply to your circular of September 5th, I venture to make the following remarks under the several heads therein prescribed :—

1. "Topics to be included under the subject of Medicine and Clinical Medicine."

A. *Medicine.*

Nature of disease; its cause, progress, and tendency. Natural history.
Individual diseases; their descriptions and differences.
Methods of Diagnosis, and a knowledge of the instruments employed.
Principles of the treatment of disease; the treatment of diseases empirical and rational.
Pathology; relation of morbid appearances to symptoms during life.
Forensic Medicine and hygiene.

B. *Clinical Medicine.*

The art of observation, and of eliciting correct answers to questions; of using instruments of Diagnosis; of prescribing and applying remedies; of storing and classifying knowledge for future use.

2. "The period in the four years' course when Medicine can be most profitably studied, and the length of time which should be devoted to it."

To familiarize the young student with his work, and show him what he has to learn, I should recommend six months' dispensary attendance in the first summer, under tuition. The courses of Theoretic Medicine should, I think,

be taken in the third year with hospital clinical study in small classes; and the fourth year should be chiefly occupied with clinical study under tuition chiefly at the bedside of the sick poor at their own houses, where the student must learn to act on his own responsibility.

3. "The manner in which Medicine can best be taught, by lecture, &c."

The theory and science of Medicine, by lectures, with frequent examinations. The practice of the art of dispensary, practice under a tutor, as above suggested.

In my opinion the system of teaching by lectures is very efficient where principles are to be taught and illustrated, and comparatively few lectures suffice for this purpose—thirty to forty. The application can only be taught by persona tuition, with the subject-matter of the lesson before the student's eyes.

Dr. GAIRDNER, *Glasgow.*

I have several times endeavoured to draft a reply to your first circular from the office of the Medical Council, but have failed to convince myself that any suggestions I could offer are worthy of the occasion. The importance, however, apparently given to an answer from all teachers (as indicated by the second circular just received), leads me at least to attempt in as few words as possible, to convey my ideas on the subject.

Practice of Medicine is a very wide field, and no teacher, I believe, can feel competent to do justice to it within the limits of a single course. It should, therefore, be taught so as to enable the student to spread his hospital study of Medicine, at least, over two years, and to supplement his deficiencies, according as he comes to feel them, either by a second clinical or a second systematic course. The regulations of most of the licensing boards are now, as I understand, favourable to this view of the case, and, in point of fact, a large proportion of my students, although not obliged to do so, actually take two courses of Practice of Physic. I have not on this account considered it right to divide my course of lectures into two, as that might disappoint some who are satisfied with one session of Systematic Medicine, but I have for many years been in the habit of varying the order, and, therefore, to some extent the mode of discussion of the different subjects from year to year; and thus I have usually brought into greater prominence some subjects in one year, and others in the next. I have also usually given a gratuitous course on two days a week in summer, limited to a group of specially chosen subjects, and have invited the students of several winter courses to attend. These summer courses have been always largely attended, and have been, I

think, of very great use in preventing the dissipation of the winter's activity and information, and conducing to a more thorough and profitable study of disease in the hospital.

In examining the winter class it is usually divided into three sections, to each of which a tutor (at present Dr. Algernon Wood Smith) devotes an hour a week (or three hours a week in all). Three or four written examinations during the session enable me personally to test the progress of the class, and certificates of merit are given to all who deserve them, in accordance with the numbers awarded.

The Hospital, or Clinical, studies of medical students in Glasgow, are conducted in the Royal Infirmary, an institution over which the University has no direct control. It might therefore happen that the clinical instruction in Medicine and Surgery might be altogether separated in some instances from the systematic. But as both Mr. Lister and I are at present on the staff of the Royal Infirmary, this severance does not take place, and both of us give much attention to the clinical instruction of our students. It is certainly well that this should be so, and I have a strong opinion, founded on experience, that no systematic teacher of Medicine can long maintain his efficiency at the highest point, without being also a clinical teacher. It is not a necessary corollary from this that systematic teachers only ought to be clinical teachers; or the contrary. At the seat of a large school, I hold that all hospital physicians and surgeons ought, as far as possible to be clinical teachers; and what is more, I feel certain that there is plenty of work for them all to do.

The great difficulty in the clinical teaching of Medicine is to instruct large numbers without sacrificing something of what may be called the true clinical method, *i.e.* the directness of the instruction as performed at the bed-side. Some of the continental systems appear to ignore this difficulty, and accumulate, crowds at the bedside, thus converting an hospital ward into a lecture-room and theatre of disputation. This method has its advantages, but puts out of view one of the first aims of true clinical teaching. No physician can adequately perform his duties to the sick when so surrounded, and so lecturing to large numbers. The students, therefore, witness only the more brilliant and startling parts of diagnosis or treatment, and most of the actual dealings with the sick escape their notice from being left to assistants. With small, or moderate numbers a physician can communicate a far higher quality of instruction, and his entire practice can be followed, and his manner of dealing with the sick observed throughout. I, therefore, much prefer small or moderate numbers at the bedside (say not more than a dozen) to thirty, forty, or fifty. In a large school it will be difficult to give instruction in this way without a number of clinical teachers, and, therefore, I am favourable to as many as possible being induced to enter the field. Perhaps, also, the union hospitals might be made more available than at present for

clinical instruction. If the personal observation and recording of cases under the eye of a provincial teacher of experience, the record being perused and guaranteed by him, were made a substitute for a certain proportion of what are called clinical lectures, many students might be induced to devote a summer, or autumn, or even more, with great advantage, to the quiet and unassuming practical study of disease in various places scattered over the country, and the duty of the great hospitals would be both lightened and assisted. I believe that clinical training would be made much more thorough than at present under such a system.

The clinical lecture is, strictly speaking, only a subordinate part of true clinical instruction; but at present the clinical lecture is the only part of it which commands the attendance of the greater proportion of the students, and therefore the only point at which tests of attendance are applied by the regulations. In the case of Surgery, a good deal of truly clinical instruction can be given in the lecture room. But in Medicine nearly the whole field of internal disease, and especially all that concerns râles, cardiac limits, pulses, temperatures, and generally all the phenomena of acute diseases can only be taught directly at the bed-side; and, therefore, it is very questionable whether the present arrangements are really efficient. Having regard to present arrangements, however, I always endeavour to make the lectures called clinical as direct and practical as possible, and wherever it is possible with good effect, I bring the patients into the lecture room. When the lecture is based upon a report taken at the bed-side, as often happens, it is very favourable to accuracy, and also to the general interest in the case, if the lecturer can say —"This report, gentlemen, is simply a record of observations made in the presence of a number of you, and it is in the very words and order in which we took down the facts at the bed-side." There is also an advantage in telling off individual students, or sections of the class, for the investigation of particular points, under a senior student chosen by the teacher, or by themselves, and I have lately been extending the use of this method, I think with advantage. But after all, the clinical instruction in Medicine of a large school is a very difficult duty, and a very heavy responsibility. I do not believe that any one method, or any one teacher, can do all that is required; and on this account I should be favourable, within reasonable limits, to a multiplication of teachers.

I believe that the new regulations in force for the last three or four years as regards clinical examinations have given, and will yet give, a great impulse to genuine clinical instruction. But there is a serious difficulty in the way—the want of time. Students who begin surgical study in their second year and who get so far interested in it as to continue in the surgical wards of the hospital during the third winter (or, perhaps, even the third summer), simply cannot possibly learn Medicine at the bed-side. They cannot possibly have had opportunities for knowing all that is to be learnt by stethoscope,

microscope, chemieal tests, thermometer, sphygnograph, &c. &c., in addition to the ordinary facts of elementary diagnosis. I am satisfied that very many students are thus thrown out of all ehance of a proper edueation in these matters; for these are precisely the points that ean only be learnt at the bed-side.

No one would wish to circumseribe unduly the time devoted to Surgery; but, perhaps, some regulations ought to be made by the Medical Counеil, to enable the student to dispose properly of his time in hospital study. It might even be found practieable to securе that the medieal and the surgieal visit should be at diffcrent hours; so as to allow of both being effeetually attended during the third session as well as the fourth. To allow students to attend both medical and surgieal clinical leetures, while the two visits are at the same hour, is simply a delusion and a snare.

Sueh are the few observations that occur to me on the subject on whieh you have for asked my opinion.

Dr. WILLIAM W. GULL, *London.*

In reply to your letter of July last on the subjeet of Medieal Education, and especially to that part of it which relates to the study of Medieine and Clinical Medieine, I beg to make the following suggestions:—

I. That the elinieal study of Medieine should not be undertaken until the end of the first year of the four years preseribed, but that students may yet advantageously pass some time of the first year, espeeially after the first Winter Session, in the out-patient rooms and wards of an hospital, so as to familiarize themselves with the aspects of disease.

2. That Clinical Mcdical studies should formally begin after the first Winter Session, or more commonly, at the commeneement of the second year.

3. That the student should at the outset of his elinieal studies be associated with a elinieal reporter of older standing.

4. That systematic written reports of medical eases should be made by students of the third year, or at an earlier period, if after practical examination it be shown that the rudiments of elinical knowledge have been acquired by them.

5. That from the clinical reporters who have completed the third year of study, should be seleeted for their proficiency clinical assistants, who should form the staff of the clinical physician.

6. That practieal instruetion at the bed-side should occupy a larger space of time than has hitherto been the custom.

7. That in view of the extension of clinical study, the duties of the assistant-physicians to hospitals might be enlarged, so as to give them a more important part in the clinical teaching than now usually falls to their share.

8. That Morbid Anatomy, as a part of Clinical Medicine, requires much more time to be spent upon it than at present, so that instead of a hasty evisceration of the dead, exact dissections of morbid parts might be made by clinical students, thereby affording them closer acquaintance with the mechanical effects of disease.

9. That a clinical laboratory should exist in every hospital, in which might be carried out more complete microscopical and chemical examinations than is practicable at the bed-side.

10. That the museums of morbid anatomy, which have been formed in hospitals, and which are too little read by the student, might be made more useful.

11. That as the practical education of the mind and senses for the observation of disease forms the principal part of medical teaching, systematic lectures on Medicine might be limited to general principles, and the teaching of special diseases be made clinical.

12. That this limitation of lectures might be the more recommended at the present day, as the literature of Medicine supplies all that is wanted for the purpose of reference.

13. That lectures are nevertheless of great value; not only as a bond between teacher and student, but as affording the best means for teaching the principles of a science.

14. That in determining the fitness of a student to become a practitioner, practical tests should, in all directions, occupy a more prominent place than they now do, the object of the examination being to determine skill as well as knowledge.

15. That every improvement in examinations gives the best and most efficient aid to clinical and all other teaching, the supply being here, as elsewhere, quickened by the character and exactness of the demand.

Dr. HALDANE, *Edinburgh.*

I have the honour of replying to the questions proposed by you as Chairman of the Education Committee of the General Medical Council on the subjects of Medicine and Clinical Medicine.

1. "Topics which may most advantageously be included under the subjects of Medicine and Clinical Medicine."

In reply, I beg to describe the mode in which my own courses of the above

subjects are conducted. My class for the practice of Medicine meet daily, except on Saturday, during the Winter Session; and in my lectures I endeavour to go through the whole subject each session, although it is of course impossible to do so in an exhaustive manner. I think it better to adopt this plan than to divide the course, as a large number of students only attend during a single session. The arrangement I adopt is the following:—

1*st*. General or constitutional diseases, as low fevers, gout, rheumatism the degenerations, &c.

2*nd*. Special or local diseases, including diseases of the nervous, respiratory, circulatory, digestive, genite, urinary, and integumentary systems.

In the clinical course there is a daily visit to the hospital wards and a bi-weekly lecture. At this visit the students have an opportunity for seeing and taking part in the examination of patients, and are exercised in auscultation, percussion, &c., as well as in the chemical and microscopic examination of urine and other secretions. In the lectures, the more important cases are considered more fully than would be possible by the bed-side.

2. "Period when Medicine should be studied, and length of time to be devoted to it."

As the classes are at present arranged, I think the practice of Medicine should be attended during the *third* Winter Session. Clinical Medicine should be attended not later than the third summer, and should, I think, also be attended during the fourth winter. One course of systematic lectures is, I think, generally sufficient. Clinical Medicine should be attended during nine, or, still better, during twelve months.

3. "Manner in which Medicine can be best taught."

I think a combination of lectures and practical instruction is the best. With the aid of lectures the principles of Medicine are mastered, and their application is carried out in the clinical class. In the systematic course, I attach great importance to the regular examination of the students. I devote one hour a week to oral examination, and find the greatest possible benefit to result from it. In addition, there are three or four written examinations in the course of the session.

Dr. BENCE JONES, F.R.S., *London*.

I have tried to limit myself to the shortest possible answers to the questions you have asked me. To enter fully into the subject of medical education would require a long essay, far longer than the Committee might care to read; and, with their great knowledge of the subject, I considered

that headings of chapters, rather than full details, would be the most suitable replies that I could give to you.

1. "What topics may most advantageously be included under the subject of Medicine and Clinical Medicine."

I do not see how the subject can be divided into topics, some of which are necessary for the efficient practice of Medicine, and some not necessary.

It seems to me that all the diseases that come into the medical wards of an hospital should be used for the instruction of the pupils. Even cutaneous diseases and diseases of the eye should not be left out because they are not of vital importance; for these diseases furnish the clearest demonstrations of morbid actions, and of the effect of remedies; and it is very possible that such cases would be among the first to which a young practitioner would have to attend.

2. "At what period in a four years' course can Medicine and Clinical Medicine be most properly studied, &c.?"

I am of opinion that the whole of the fourth year should be given to the study of Clinical and Forensic Medicine. The third year should be given entirely to Clinical Surgery and Midwifery. The first two years to Anatomy, Physiology, Botany, Materia Medica, and Therapeutics. The pupil, before he begins his medical education, should have a thoroughly-practical and systematic knowledge of Chemistry and Physics.

3. "In what manner can Medicine and Clinical Medicine be best taught, &c.?"

I think the systematic course of Lectures on Medicine, and the present system of Clinical Lectures, and bed-side visits, should be entirely changed, so as altogether to do away with the certificates of attendance at the bed-side and in the lecture room.

1. Some good handbook of Medicine, and good monographs on different diseases, should be recommended or prepared for the pupils for study and reference.
2. The highest system of Clinical Instruction should be organized. All the pupils of the hospital should be divided among the physicians; and each physician should have assistant-physicians, or temporary assistants, in sufficient number to allow every pupil to be well taught daily.
3. At the end of every six months at least each pupil should be examined by the physician at the bed-side, and by written examination papers also. Until two such school examinations in Medicine have been passed, the pupil should not go up for the last Licence Examination; which should also be held at the bed-side, and by written papers.

This last examination should be supplementary to a previous examination, to be passed at the end of the second year in Anatomy, Physiology, Botany,

Materia Medica, and Therapeuties, as these subjects should occupy the two first years of study.

Before any pupil is allowed to begin his medical education, he should pass a matriculation examination, which ought to be held by the Licensing Body rather than by the school; and this examination, among other things, should insure a thorough knowledge of Chemistry and Physics.

Considering the immense and the increasing extent of Chemistry and Physics, and their importance in the study of Physiology, Materia Medica, Botany, and Pathology, it is hopeless to try to get even a superficial knowledge of them by lectures, or by a month or two of laboratory instruction.

Every medical man wants the best practical laboratory knowledge possible; and to understand the Physiology, Pathology, and Therapeutics of the future, he wants not only the last results of chemical and physical science, but to have sufficient knowledge to profit by the rapid progress of these sciences.

I may put my replies in a table thus :—

Before Medical Education begins	General Education, Chemistry, and Physics	Matric. Exam.
First & Second Year	Anatomy, Physiology, Materia Medica, and Therapeuties ...	Little-go „
Third Year.....	Surgery and Midwifery	Licence „
Fourth Year	Medicine	

In addition, every half-year, practical and written examinations should be held in each school; and, unless the pupil passed there, he should not go up to the Little-go or Licence Examination.

I fear that I shall be thought to have gone beyond the questions asked me, but I must urge the importance of the subject as my excuse.

The Medical Council have included ten subjects in their four years' course. They have entirely omitted Physics and Botany; probably because they considered the mass of knowledge to be obtained in four years was overwhelming.

It seems to me that by making the study of Chemistry and Physics preliminary to the study of Medicine, the following advantages would be gained:

1. Chemistry and Physics, the foundation of all vegetable and animal physiology, might be thoroughly learned, because any amount of time might be given to them.
2. A most extensive subject would be taken out of the four years' course; and thus the mass of knowledge to be obtained in four years would be lessened.
3. More time would thus be given for more perfect work at the medical subjects.

4. The medical man would have the opportunity of knowing as much Chemistry and Physics as the pharmaceutist, who, from his improved education, is already becoming the adviser regarding Water, Air, Food, and Drink, and is even consulted as to the diagnosis of some diseases (Diabetes, Albuminuria, &c.), and as to the action of remedies.
5. The accuracy, the clearness, and the extent of Chemistry and Physics and their applications to the explanation of every action that occurs, as well around us as in us, make them a means of mental education for medical men far superior to that which now obtains.
6. Such a scientific education of medical men would hasten a corresponding change in the education of the public; and when this occurs, there will be a better chance than there now is of a reasonable understanding between the practitioner and the patient. This would gradually diminish the amount of quackery, imposture, and credulous fancy which, under the present system of education, is to be found in every class of the community.

Dr. LAYCOCK, F.R.S., *Edinburgh.*

Considering that the scheme of education is to be specially adapted to the exigencies of general practice, the first and the most important class of topics of Medicine seems to me to include those principles of Medicine that are universally acknowledged to be available in every and any department of practice in which the practitioner may have to engage. This class of topics would include the treatment of general diseases like fever and inflammation, of disease of the blood, of diseases arising from general causes, such as endemics and epidemics, and diseases of a constitutional kind like gout, struma and syphilis. A second class of topics would include those matters which belong to Medicine as a special department of practice, namely, the treatment of those diseases of particular organs and tissues, and of systems of organs which do not specially require surgical aid. Some of these, however, although not surgical, have become the topics of special courses of instruction, such as certain diseases of the eye and the ear, and of women and children, and with much advantage to practice. It is within my experience of twenty-one years as a teacher, that the nature and management of mental diseases might be advantageously taught in like manner.

By the term Clinical Medicine, I presume is meant bedside instruction in the medical wards of a public hospital as now required by the regulations of examining boards. I must observe, however, that out-door hospital and dispensary practice are available to clinical instruction, if by that is meant

teaching from cases under treatment medically by a physician competent to teach as well as practise his art. The topics under this head must necessarily vary according to the age of the student. Those for the beginners would include instruction in that kind of conduct and behaviour to the sick and to his future professional brethren which is not only becoming his profession but necessary to success in practice; a systematic training in the observation of diseases by the unaided senses; and a grounding in the elements of physical diagnosis, and the use of those clinical instruments of research that are the most generally and most readily available in practice. Being thus fitted by this elementary course of clinical instruction for a more advanced or senior class, the student could then be more profitably trained in the observation of the exact order and course of diseases, together with the results of treatment, and of the anatomical changes (Pathological Anatomy) associated with diseased states, whether they can be observed in the living or the dead.

As to the periods at which Medicine and Clinical Medicine can be most profitably studied. I presume each, to this end, should be so studied in relation to the other and to the auxiliary sciences, that the greatest results may be attained in the shortest time and with the least labour. If the student have already got a good knowledge of the scientific or auxiliary subjects of study (being the first six of the ten subjects named in the circular), he will be in a position to commence thus satisfactorily the elementary study of Clinical Medicine, but not otherwise. This period, I apprehend, would be the summer succeeding to his second winter session. Possessed of this elementary knowledge, he would be able to join a senior class of Clinical Medicine at the commencement of his third winter.

The object of a course of Medicine is to generalize and systematize year by year all the current doctrines and the new views which are continually brought forward in such a way that the student may most readily comprehend and remember them, and apply them to practice. To this end it seems to me to be essential that he should have some preliminary personal knowledge of the course and symptoms of diseases and the means and methods of diagnosis. This knowledge, I think, would be best acquired by preliminary studies in Pathological Anatomy, and by the elementary course of Clinical Medicine noted above. From this point of view attendance on Medicine should not begin earlier than the third Winter Session, and after the completion of an elementary course of Clinical Medicine.

The time that should be devoted to Medicine and Clinical Medicine is sufficiently indicated by their great practical importance. They cover so large a part of the student's future professional work that they ought, almost to the exclusion of the auxiliary sciences, seriously to occupy the remaining two years of study in common with Surgery, and some of the more important specialties, more particularly diseases of women and children, of the eye, and

mental diseases. Under the latter should also be included all those affections of the brain which disorder the feelings, the will, and the understanding, although strictly speaking not insanity. These might be studied during the fourth year. That the mind of the student should not be diverted from these practical studies, the examinations in the auxiliary sciences should be already passed.

As to the method of teaching. It is quite certain that Medicine, however superficially treated, cannot be satisfactorily taught in one winter session. It seems to me, therefore, worthy of consideration whether there should not be a division of the subject into two courses, namely, a summer course for a senior class in which the principles or first division of topics should be taught. This would include Epidemiology and public Hygiene in relation to practice. The topics of the second division would fully occupy a winter session, and could be taught to a junior class of students. No practitioner would be fit for the poor-law service who was not well acquainted with the first class of topics. It appears to me essential that in the course of Medicine, Etiology, Pathological Anatomy, and Therapeutics should be systematically taught in reference to treatment, and that the teacher should have the means of illustration of his lectures at command. And those especially with a view to practical Therapeutics, that he should have change of beds in an hospital so as to be able to illustrate treatment by cases.

The topics of the elementary class of Clinical Medicine would be most advantageously taught tutorially. To this end the utmost encouragement should be given to tutorial clinical instruction by leaving it free from any restriction, whether as to person or place. This plan would render it essential that the student should pass a successful examination as to his knowledge of these preliminary or elementary topics, before he enters upon the study of Medicine and the higher departments of Clinical Medicine.

The teaching of this latter department might be best effected partly by bedside instruction, partly by lectures, which should be essentially demonstrative, and only given as opportunities for demonstration arise. A sufficiency of beds and a lecture-room expressly constructed for this kind of teaching would be needed.

Amongst the points deserving of attention in connection with the subject of inquiry entrusted to the committee, I would mention—

1. Whether the lecturers on Medicine and Clinical Medicine might not be invited to draw up text-books, which would serve, like the *Pharmacopœia*, for general use in the schools, and yet leave the individual freedom of thought and inquiry which is essential to successful teaching. An elementary clinical text-book might not only include the subjects proper but the general rules of professional ethics and etiquette, and which have no place in medical education.

2. Whether some check to the frequent repetition of the same subject could

not be devised. I believe the doctrines as to inflammation are repeated in four different courses in this University.

3. Whether to this end, and the better economy of the labour and time of the student, some of the current courses might not be advantageously shortened and others recast in accordance with modern medical science and practical requirements. Five months is allotted in this University equally to Obstetrics and to Medicine, although of very varying extent. The elements Pathological Anatomy might be more effectually taught in connection with normal Anatomy than separately, and Materia Medica made part of Chemistry, Botany, and Natural History, and Practical Pharmacy. In short, that the auxiliary sciences should be taught not merely as sciences, but in their practical relations to the future career of the student and the general practitioner. Probably tutorial classes in these preliminary departments would best serve their purpose.

Dr. MACLEAN, *Royal Victoria Hospital, Netley.*

I have the honour to subjoin answers to the three questions on Medical Education submitted to me by the Chairman of the Committee, appointed by the Medical Council to enquire how the various subjects of Medical Education which have been deemed requisite by the Council, may be taught with most advantage.

The position of the Professors in the Army Medical School is a peculiar one, inasmuch as we have to do with gentlemen who have, in so far as civil life is concerned, completed their medical education. The candidates for commissions in H.M. British and Indian Services, have not only passed the required examinations by the various licensing boards, but, in addition, a stringent test of qualification by the Government Examiners at Chelsea.

I have not failed to observe that some who have passed the various examinations above named, have derived their knowledge of practical Medicine almost entirely from books. They have either had no systematic clinical training, or they have neglected such opportunities as they have had. Such men when placed in charge of the sick are at first quite abroad; they hardly know how to set about a systematic inquiry into the man's condition, they betray their ignorance of the right mode of handling and using the ordinary aids to diagnosis, the records they make of their cases are at first vague, and missing, as they almost invariably do, the real points on which to seek the true elements for diagnosis and prognosis, their first efforts at case-taking result in documents of no value to themselves or others. Thus it comes

about that the time of teachers in this school is often occupied in teaching elementary matters which ought to have been mastered at an early period.

On the other hand, we have men, who, having had real bed-side teaching, are able at once to enter on their duties here, they display familiarity in the use of all the ordinary aids to diagnosis, handle the sick as experts should, and their journals contain valuable records of their observations. Men of this stamp profit much by their studies here, and are able to turn their minds at once to the careful observation of diseases altogether new to them.

I have been thus led to attach great importance to the inquiry on which the Council has entered, and I am very strongly of opinion that the present system requires modification and reform. I do not think that the study of Clinical Medicine should be left so much as it now is to the discretion of the student.

I go along with my experienced colleague Dr. Parkes in all he says at p. 16 of his "Scheme of Medical Tuition," on "the necessity of giving every student a good foundation," by means of the elementary courses of instruction on which he insists, and which ought to be completed before a medical student is suffered to approach the bed of a sick man. For want of preliminary lessons of this practical kind, more than half of the physician's clinical lessons are utterly thrown away, and what the student acquires for himself from books is merely a vague kind of *information*, quite apart from *knowledge*, often in fact a mere effort of memory.

1. "What are the topics which may most advantageously be included under the subject of Medicine and Clinical Medicine?"

From what I have written in the foregoing letter it will be seen that I am of Dr. Parkes's opinion that the study of medicine should embrace, 1st, practical instruction in the terms of the science, the names and classification of diseases, with just enough explanation of their symptoms and course as to prepare the mind of the student for their more full study. In this, or a supplementary course, all aids to diagnosis and physical examination should be mastered. This done, the student will be in a position to profit by, 2nd, an advanced course of lectures on the practice of physic. At this stage the pupil will be ready to enter the hospital, and to commence his bed-side studies under the guidance of a competent teacher. He can then profitably follow the methods of investigation pursued, examine the cases for himself, and take notes in an intelligent manner.

2. "What period in a four years' course can they be most profitably studied, and what length of time should be devoted to them?"

The study of Medicine should begin in the third year of the student's studies, and his clinical instruction should go on until the end of his fourth year.

3. "In which manner can they best be taught—by lectures, practical instruction, or otherwise?"

I have already in part answered this question. The first or elementary instruction should be given by the tutorial method, the more advanced course by lectures, and the clinical instruction partly at the bed-side, and partly by lectures confined to comments on and explanations of cases actually under treatment.

Dr. OWEN REES, F.R.S., *London.*

1. The topics which I consider should be included under the subject of Medicine and Clinical Medicine, should be not only those which relate to the nature and causes of disease, but such as must receive notice in frequent reference to General Pathology, and such as must arise in referring to healthy Anatomy and Physiology.

These two last-mentioned subjects should be constantly kept in view by the teacher as tending to connect and consolidate the instruction he imparts.

2. The commencement of the third year seems the proper time for entering upon the study of Medicine ; but the student should be encouraged to go into the wards as early as he can, if only to look at diseased persons, and to hear the casual remarks of those around him.

A great deal of practical Medicine may be learned thus, even when the mind is totally unprepared by previous study.

I may be permitted, perhaps, to remark here, that four years is too short a period for the purposes of the student, when we consider the vast number of subjects to which his attention is directed in the present curriculum.

3. Were we restricted to one plan of teaching, Medicine would be best taught by practical instruction ;* but I am persuaded that great advantage is derived from a systematic course of lectures on Medicine. The general knowledge so imparted is, of course, valuable in the analysis of particular cases, and I should feel it difficult to give the student as much general information as I could desire by means of practical clinical teaching alone.

In my opinion, the plan at present adopted in the medical schools ought to continue in operation.

Dr. SHANN, *York.*

It was from no want of respect to yourself, or to the Medical Council, which you represent, that I did not sooner return answer to your letter of inquiry respecting certain practical points in reference to Medical Education.

* Clinical lectures and bed-side work.

I felt, on receiving the first letter, that it would be presumptuous in me, with the very limited experience I have had in teaching, to express opinions to be laid before the ablest and most experienced teachers of the day.

When called upon myself to take part in delivering lectures in connection with our medical schools here, now for some years discontinued, I formed my plan on ideas derived more especially from the suggestions of Cullen, as given in Dr. John Thomson's remarkable life of that remarkable man.

It has been to me a matter of surprise that the singularly acute observations on the "Study of Physic," given at page 501 of "Cullen's Life," and illustrated in the notes, should not have been more quoted in the discussions on this subject. Modern advancement and ingenuity appear to have added nothing to them. I doubt not that you are fully acquainted with the observations I allude to, but if, in consequence of the absorbing demands of passing events, these well-considered utterances of the Scotch Hippocrates have faded from your recollection, a perusal of them will, I feel sure, fully repay you at a time when you are anxiously engaged in the consideration of points so ably handled by a master mind. In a note Z., p. 665, of Thomson's "Life of Cullen," it is said—

"To effectuate the important object of obliging medical students to enter upon the different branches of their professional education in what may be called a natural order of succession, without extending the course of medical study to a period of six or seven years, would seem to require the adoption in this country of the practice pursued in many of the continental universities, of having two sessions of five months' duration in the course of the year * * * * During the first session the student might be instructed in the elements of Chemistry and Descriptive Anatomy; during the second, in the Physiology of the Human Economy, and in Natural History of the three kingdoms, Zoology, Botany, and Mineralogy; during the third, in General Pathology, and in Practical Anatomy and Chemistry; during the fourth, in Therapeutics, or Materia Medica and Surgery, with a second course of Descriptive Anatomy; during the fifth, in the Practice of Physic, and in Clinical Surgery; during the sixth, in Midwifery and Clinical Medicine; and during the seventh and last, in Medical Jurisprudence, with a reptition of the Practice of Physic, and Clinical Medicine. Their arrangement would leave ample room for attendance at the proper periods, on courses of lectures on Logic, Natural Philosophy, and Moral Philosophy, where these lectures have not been previously followed, as well as for reptition of attendance on any of the medical classes, according as inclination or occasion for it might suggest."

I quote the whole passage merely to show its scope.

What I desire specially to note is, that in this scheme it is recommended that General Pathology should take its place during the first session, or at the commencement of the second year. The suggestion that I would venture to make is, that Clinical Medicine should be taken in conjunction with this course of General Pathology. By this means the student would be intro-

duced betimes, to the study of the alphabet, at least, of the book of nature, and taught to study it intelligently. This was the plan I endeavoured to pursue in my own course, taking Dr. C. J. B. Williams's "Principles of Medicine" for my text-book. A second course of Clinical Medicine would, in this case, be required in conjunction with the course on the Practice of Physic, which would enter more into details.

In compliance with your request, and not with any idea of putting forward a claim to be heard on such a question, I would venture to throw out these suggestions, their claim to consideration resting on the circumstance, that they are in accordance with the spirit, if not with the letter, of Cullen's recommendation, based on a wide experience, and elaborated in a keenly observant, practical, and essentially logical mind.

Dr. SIEVEKING, *London*.

The second circular which you have done me the honour to forward to me, invites the expression of my opinion on the subject of Medicine and Clinical Medicine.

The first question that I wish to advert to, has already been the subject of much controversy; I mean whether or not it be desirable that a series of formal lectures should be given, or that the student should be taught from manuals, tutorially. I ~~try~~ to express myself in favour of the continuance of lectures on systematic medicine, provided that notes are taken by the students, and examinations periodically held, at which attendance is compulsory. I believe that a special advantage arises from the connection in the student's mind, between the physical and intellectual image he retains of his teacher, and the teacher's doctrines. A more personal and therefore more vivid interest attaches to lessons proceeding apparently directly from his teacher's breast, than those the student acquires from books only. I would have the books supplementing the teacher, and not the teacher supplementing the books. The first two years of a student's life should, as Dr. Parkes puts it, be devoted to all those subjects which form the foundation of "Medical knowledge." The student is scarcely fitted to attend either the Hospital or Lectures on Medicine before the third year; but with a well-laid basis of preliminary scientific knowledge, he will now be easily and rapidly inducted, as compared with the less perfect system that has hitherto prevailed, into the more recondite doctrines of disease and its treatment. But, while I advocate the continuance of a course of lectures on Medicine, I would lay chief stress upon clinical teaching, and provide for full and ample teaching power of a practical character.

The third and fourth years' students should attend their Clinical Teachers in separate classes; cases should be allotted to them for careful examination, and the written reports of the students should undergo formal criticism. This is already attempted at some schools, but as there are no means of compelling students to make clinical observations, the results are not generally satisfactory. I would make the production of a certain number of properly recorded cases a condition of professional examinations by the Colleges, just as the attendance on a number of midwifery cases is imperative as a condition for the obstetric examination. The student, in my opinion, should not be encouraged—I think he should not even be allowed—to attend the out-patient department of an hospital, until he has completed the third year of his curriculum, and his attendance should then be made as regular a part of the course as at present is his attendance in the wards.*

I will not weary you with a long recitation of my arguments in favour of these views regarding the out-patient department; they are embodied in a letter which I have recently published for another purpose, and which I beg to submit to your consideration as a fuller exposition of my views. But I may be permitted to give the following epitome of them:—The forms of disease that present themselves in the out-patient department, are not the typical and severe cases met with in the wards, they much more closely resemble the average forms of disease dealt with in private practice. The student should begin his clinical studies with well-marked and clearly-defined cases, which will impress themselves vividly on his memory, and serve as a basis of comparison subsequently. When he has become familiar with the characteristic and prominent symptoms of morbid action, he will be in a position to appreciate the minuter shades of derangement, and the out-patients offer an admirable field for further study. I would make them the bridge by which the chasm now existing between clinical studies in an hospital and private practice shall be crossed. I would require each student, under the supervision of the physician or surgeon, to attend, visit, prescribe for, and take notes of at least twenty different cases. No visiting should be required, except in those cases which the physician or surgeon wished followed up for the sake of careful observation. While the student would still lean upon superior aid, he would be taught careful and independent observation; he would learn the importance of domestic hygiene; he would cease to regard the patient as a mere object of scientific interest, and learn more of the "humanity" of Medicine.

My desire generally would be to throw more teaching upon the shoulders of the present assistant physicians and surgeons. The present system, which gives men the senior appointments at a period of life when, if they are at

* I do not dwell upon the necessity of securing regular and systematic attendance in the wards (provision is already made for this at St. Mary's, as it is in the lectures); but these are details which ought to be left to the discretion of individual schools.

all appreciated by the public, their time is too much engaged in more lucrative work, prevents many of the best men giving themselves to clinical instruction, when their energies are largest, and most capable of coping with the many details that demand attention.

I would briefly sum up my remarks on "Medicine and Clinical Medicine" thus:—I hold that there should be two courses of Medicine, respectively, for second and third years' students, the one elementary, the other of a more advanced character; that no student should attend the wards until the third year, when his time ought to be almost entirely devoted to clinical work; that the student should be required to take notes of a definite number of cases, first in the wards, and lastly in the out-patient department, and that these cases should be presented at the final pass examinations as one of the qualifications.

Finally, I would remark, that in teaching Clinical Medicine, the individual student requires to be more constantly appealed to. He should be called up to report upon the pulse, tongue, temperature, secretions, and various physical symptoms; he should be examined by the bedside about treatment, diet, and doses of medicine; but all this requires more teaching power, and more time on the part of the teachers. It follows that higher remuneration should accrue to the latter than is now their guerdon, and, to insure that, I see no other alternative than that of reducing the number of schools, both in the provinces and in the metropolis. I have been anxious to write as concisely as possible, and have therefore only adverted to the more prominent topics that my experience suggests as deserving special attention; but I shall be happy, if it be thought desirable, to enter into further explanations and fuller details.

For the present, I merely add my earnest wish that the Medical Council may succeed in elevating the standard of Medical Education still further.

Sir THOMAS WATSON, Bart., *London*.

Of the ten subjects embraced in the proposed course of medical education, by far the most important, in my judgment, is that portion of the seventh subject specified, which I will describe as "Clinical study combined with clinical instruction."

By clinical *study* I mean the steadfast observation of actual disease at the bedside of the sick.

By clinical *instruction* I mean the explanation of what the student thus sees by a teacher properly qualified to give it; who would point out to him in each case how the diagnosis of the disease is best made, what are the symptoms which should guide its treatment, what treatment he adopts, and why

he adopts it, the apparent effects of that treatment, and, in cases that prove fatal, the comparison between the actual and the anticipated morbid conditions of the interior of the body.

The supreme importance of this combination of study and instruction—viewed in connection with the briefness of the period during which the great bulk of medical students can ever hope to enjoy its priceless advantages—requires that it should be begun as soon as the student can be expected to profit by it, and should be continued uninterruptedly throughout the whole of the subsequent part of his prescribed course of study.

The student is fit to enter upon this combined course as soon as he has attained a fair knowledge of the structure of the human body, and of the ascertained functions and uses of its several parts; and also has, by attendance upon a course of lectures on Medicine, or through some equivalent means, learned the order in which recognized diseases have been arranged and grouped, and the leading facts which have been ascertained concerning each of them. He will thus be prepared to direct his personal observation intelligently, and will obtain a framework for registering, in a methodical manner, the results of his coming clinical experience.

By the "equivalent" of a course of lectures I mean the perusal by the student either of an approved treatise on Medicine as a compendious ~~guide~~ whole, or of separate works on different parts of it, selected carefully for his use by a competent adviser.

But a well arranged and digested course of lectures is to be preferred for these reasons—that the desired information is gained at much less expense of time and trouble, with much more of interest and curiosity in its actual acquisition, and with far more certainty of its steady pursuit from the fixed recurring exigencies of the hours of its delivery.

It follows that Anatomy in its broad sense, and Medicine as a methodized subject, should, of the strictly medical parts of the proposed course, be the earliest taught.

The foundation of chemical knowledge and inquiry should also be early laid. I am not sure that this subject ought not to be included among the preliminary requisites for the medical curriculum.

Some of the other topics may, much more easily and properly than those I have mentioned, be postponed or curtailed, should time be wanted, for after study and consideration.

I doubt whether the tenth subject, Forensic Medicine, should find a place in a course prescribed for all medical students in common. Its singular interest and its vast importance are unquestionable. But not one in a hundred of those engaged in the practice of Medicine in this country can ever become safe guides or capable of the more difficult and abstruse experimental investigations which from time to time are required in judicial proceedings incidental to our social life. These inquiries should be

committed to recognized professional experts, who ought not to be regarded or employed as mere witnesses in any case, but as medical assessors to the appointed authorities.

Certain portions, or a certain degree, of information in Forensic Medicine may, no doubt, be mastered by and expected from the ordinary ~~practice~~ of practise Medicine. But of this whatever is orally communicated in the formal lecture might as well be acquired at the reader's leisure from appropriate treatises, and the very interest of the subject will invite and almost secure its study in private. Whatever, again, in the lecture could be shown only by skill in experimenting can scarcely, for any practical use, be learned in that way.

As to "the manner in which Medicine can best be taught," my opinion may readily be inferred from what I have already written. It is the old question between professorial and tutorial methods of teaching.

In my judgment both are expedient—the professorial to give the hearers a condensed but connected and systematic view of the whole subject in hand, the tutorial to secure actual and accurate knowledge of its particular facts and doctrines. A professor may thus enlighten a whole class at once; a tutor can instruct a limited number only. We have enough, in some respects perhaps more than enough, of professors; of tutors we have far too few.

By tutors I mean duly qualified men, whose business should be, not that of packing the student's mind and memory with details or particular information, the greater part of which would presently slip out of them again, yielding no useful or lasting fruit, when it had served the student's immediate purpose of helping him through his terminal examinations, but that of eliciting, by means of regular, continual, familiar questioning (carried on by word of mouth or by written queries), what the student already knows, and especially what as yet he does not know, and of aiding him by directing his attention aright to fill up the ascertained gaps, to correct detected mistakes, and to acquire the requisite knowledge for himself.

I am satisfied, by much observation, not limited to medical studies, that this is, of all methods, the most sure and effectual method of teaching.

Dr. S. WILKS, *London.*

In answer to your request to offer an opinion as to the best mode of teaching Medicine, it must be borne in mind that two very opposite views are prevalent in the profession as to the means most calculated to produce an efficient practitioner.

There are those who maintain that the student should be personally

instructed in the elements of knowledge until he is fit to leave the schools, whilst others insist that he should be at liberty to pick up information as best he can, and then be submitted to a searching examination.

The first, or tutorial method, binds closely together the teacher and pupil, who become intimately acquainted, and the exact amount of knowledge which is taught is strictly regulated. Since accurate knowledge is required, time will not allow more than elementary instruction, the higher subjects in Medicine being only for the few. The majority of students, it is said, would thus pass a good examination, and no one of them could go out into the world without a fair basis of information. The lecturer would thus become a demonstrator, or even approach to what is popularly called a "grinder," and the present system of delivering a course of lectures would be abolished.

The other method is the exact opposite of this, and implies that at the present day the education of students is too restricted to time and place—that the London student should be allowed to visit any hospital he chose, or attend any lectures he thinks best. He need not be known to any teacher for special purposes of instruction, but must collect what he may deem valuable from all sources, and finally submit to a rigid examination before he is allowed to enter upon the practice of his profession. Under this system it is said that we should have good lectures delivered by experienced physicians, whilst in the other plan the present lecturers would sink into tutors, and there would be an end to such courses as those of Lawrence, Cooper, Watson, Graves, or Trousseau.

To take the present mode of teaching as we find it, it must be admitted that the attendance on such high-class lectures as I have named affords little instruction to the uninitiated student, as they do not include any practical clinical teaching.

Medicine is supposed to be taught in three ways—by a regular systematic course of lectures, by the remarks of the physician at the bed-side of the patient, and by lectures (styled clinical) on special cases of interest. By none of these means is the student taught the elements of his art, and thus at Guy's a junior officer, mostly the registrar, is appointed to fulfil this duty. I mean that the lecturer may, for example, dilate upon the subject of auscultation; but he does not see that each individual of his class obtains any practical acquaintance with the art, and thus Medicine is in the same position as were formerly Chemistry and Anatomy when taught *ex cathedrâ*, and the pupil was not himself employed in analyses and dissections. At Guy's our most distinguished teachers, as Bright and Addison, gave no instruction of this kind, but were ready to blame any of their class who were deficient in elementary clinical knowledge. This was imparted formerly by the secretaries of the Clinical Society, and of late by the registrars—there always having been felt the necessity of such a teacher ever since Guy's has had a school. The office, however, was one scarcely recognized, and the manner in which

instruction was afforded depended entirely upon the discretion and zeal of the teacher.

I would recommend that the present courses of lectures on Medicine should be continued, for even could the lecturer, by becoming tutor, impart to a larger number of men valuable elementary knowledge, he would be denying to those students who wished for a superior education the benefit of his experience. But, apart from this, it would not be well to abolish lectures the delivery of which by distinguished physicians is a boon to the profession at large.

I would also recommend the continuation of clinical lectures as before; also the instruction at the bed-side.

In addition, there should be a more systematic method of teaching elementary Clinical Medicine. This might be done by a junior officer, who would then hold the same relation to the regular lecturer as the instructor of Practical Chemistry or demonstrator of Anatomy does to the lecturer on these subjects. I am under the impression that at University College such a professor or purely clinical teacher has always existed. Under the term "elementary clinical instruction" is included the method of using the stethoscope, microscope, laryngoscope, &c.

I might remark that the medical officers are at the present time in a position to offer a much larger amount of instruction in elementary knowledge could some method of forming classes to attend the wards be adopted. If, for example, a physician had a certain number of pupils in his class for three months, he would soon know them personally, and the amount of knowledge they individually possessed; and he would thus be enabled, by directing them to a series of cases, to impart in this time some good practical information. But when a class is a promiscuous one, as is too often the case at the present time, the method is impracticable; for although the physician may have his own clerks who are constantly in attendance, the majority of the pupils are erratic; and thus it happens that, after having spent much time on a case in illustration of some important principle, he is asked to repeat it all on the following day, when he would be better employed in endeavouring to advance the class who had first been with him. Could the physician insure a class of the same pupils he would be enabled, during the time he is visiting the wards, to impart much more instruction than he does at present. Should the Medical Council coincide with these views, it would seem that some pressure must be put on physicians and pupils in order to carry them out.

As regards the exact period at which Medicine should be taught, I think that no very exact time can be fixed. Of course the elementary subjects must precede the practical, and, as regards Medicine, the pupil should gain some elementary clinical knowledge before he can become clinical clerk or attend the physician's classes. In a large school it will be impossible to

insist upon all pupils of the same standing being employed in the same duties, seeing that the hospital arrangements will not allow of this : thus, whilst some are dressers, others must be clinical clerks, obstetric clerks, or be engaged in the *post-mortem* room. Should there be a fixed time for the holding of these appointments, it would necessarily limit the number of pupils to each school.

There has hitherto been very little inducement given to students by the examining boards to gain any but a theoretical knowledge of Medicine. Should there be an improvement in this respect, it will at once react on the teaching of the schools. During the period I have been examiner at the University of London, where a practical clinical examination is required, I have been much impressed with the fact that not a single candidate has ever appeared who was not quite *au fait* at the bed-side in a thorough investigation of the case of the patient.

SURGERY AND CLINICAL SURGERY.

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REPLIES.

T. ANNANDALE, Esq., *Edinburgh.*

1. Under the subject of Surgery, I would include the principles of surgical practice and the subjects on which these are founded; namely, Surgical Pathology, Anatomy (textural and regional) and Physiology proper.

These latter are included under other subjects, but in the writer's opinion, it is very important that the portions of these subjects which bear upon surgical principles or practice, should be carefully demonstrated or explained in teaching Surgery.

Clinical Surgery should consist of the exhibition and explanation of cases of disease and injury in the living subject, and of careful instruction in the simplest and most efficient methods of studying the symptoms, progress and results of treatment in typical examples of such disease or injury.

Lastly, the performance of operations on the dead body, and the application of bandages and the various surgical appliances, practised either on a model or on the living subject, must be included under Surgery.

2. One six months' course of lectures and demonstrations on the principles of Surgery in the student's second year of study.

3. Clinical lectures and instructions during the whole period of the student's four years' course.

The arrangements of most hospitals are such that the student can always find time to devote some portion of two or three days a week to surgical-clinical instructions, without interfering with similar instruction in the other important subjects.

3 (*a.*) By lectures on the Principles of Surgery, limited, however, to one six months' course; the number of lectures to be left to the discretion of the teacher, such lectures to be made as demonstrative as possible by the exhibition of fresh and prepared illustrative specimens of healthy and morbid Anatomy, by models, casts, drawings, and simple experiments.

(*b.*) By practical instruction in the manipulation and use of instruments, in the performance of operations, and in the application of bandages, splints, and other surgical appliances. This instruction to be given in small classes numbering not more than twelve students.

(*c.*) By clinical instruction, which should include lectures, on illustrative cases, or on some special surgical subject, explanations and demonstrations in the wards, and operating and pathological theatres, and every encourage-

ment to the student to watch the symptoms and progress of disease for himself, and take careful notes of the same.

In order to do this more effectively, I would have certain wards of the hospital, employed for instruction, thrown freely open (under proper supervision) to the student, and one or more cases from time to time allotted to him to study and report upon. The result of such study and report to be examined by his teacher. If such student in this way mastered only six cases in a session, it would be much more serviceable to him than if he superficially studied one hundred in the same time.

Dr. JOSEPH BELL, *Edinburgh.*

In the following brief sentences I have endeavoured to answer *seriatim* the questions proposed in your circular of August 7th.

1. *Surgery*, should include—
 (*a.*) A full course of instruction in the principles of Surgery, including the doctrine of inflammation, the pathology of morbid growths, the method of repair of fractures, and such subjects.
 (*b.*) Lectures on the diseases and agencies of the various systems, such as osseous, vascular, &c., *without* local and individual details.
 (*c.*) Lectures and anatomical demonstrations of the surgical diseases and injuries of the more important regions, abdomen, pelvis, &c.
 (*d.*) Careful tuition in small tutorial classes, in the mechanical details of bandaging, putting up fractures.
 (*e.*) Similar instruction for the more advanced pupils in surgical operations on the dead body.

2. *Clinical Surgery.*—This must be taught with a patient as the text, and must consist of at least two points :
 1. That the student be shown how the nature of the patient's disease is recognized by the teacher.
 2. That the treatment should be shown him, and its character verified by the result.

Constant ward visiting in small numbers at a time under the supervision of competent instructors, is a *sine quâ non*, if the student is to gain the advantage of the more special clinical teaching of the professor.

I.—Systematic Surgery should be attended twice, and not later for the first time than the second winter session ; Clinical Surgery may be attended with advantage during the whole course of study from the second summer to the end, if the school arrangements permit this to be done without clashing with the Clinical Medicine hour.

II.—Sections (*a*) (*b*) and (*c*) of my first answers may be taught in lectures; aided by daily oral examination for a few minutes. Lectures (*d*) and (*e*) must be taught in small tutorial classes and in the most practical manner.

Clinical Surgery must in every case be taught by the bedside and in the operating theatre, with a patient before the class.

E. R. BICKERSTETH, Esq., *Liverpool.*

In reply to your circular dated August 7th, requesting my opinion regarding certain points in Medical Education, I beg to say—

1. That I consider the topics discussed in the course on Surgery should be confined as strictly as possible to the principles of Surgery.

I enclose the prospectus of my course as taught in this school (the Liverpool Royal Infirmary School of Medicine).

2. That the period for studying the principles of Surgery should not commence till the student has attended one Winter Session of Anatomy and Physiology, and that it should extend over two Winter Sessions. Clinical Surgery should commence after the first Winter Session on Anatomy and Physiology, and should extend over the whole of the remaining three years.

3. That the principles of Surgery should be taught by systematic lectures, and that Clinical Surgery can be alone inculcated by practical instruction and illustration in the wards or in the theatre of an hospital.

[*Prospectus.*]

PRINCIPLES AND PRACTICE OF SURGERY.

Mr. BICKERSTETH, F.R.C.S. Edin., *Surgeon to the Royal Infirmary.*

The course is divided into two parts :—

I. PRINCIPLES OF GENERAL SURGERY.—Irritation. Congestion. Inflammation. Suppuration. Abscess. Sinus. Mortification. Ulceration. Repair, or the Healing Process.

Surgical Fever, Pyæmia. Traumatic Delirium. Erysipelas. Cellulitis. Tetanus. Hydrophobia. Poisoned Wounds.

Nervous Affections : Hysteria and allied diseases. Shock and Reaction. Syphilis and Venereal Diseases. Cancer. Scrofula.

Tumours : innocent and malignant. Hypertrophies. Outgrowths. Polypi.

II. PRACTICAL SURGERY, embracing Injuries and Diseases of Special Structures and Regions.

Fractures, Dislocations, Sprains, Contusions, Wounds.

Injuries of the Head: Concussion. Compression, Fractures of the Skull. Diseases of the Blood-vessels and Absorbents.

Diseases of the Bones and Joints.

Hernia, and its varieties.

Diseases of the Genito-Urinary System: Stricture. Prostatic Diseases. Stone in the Bladder, Lithotomy and Lithotrity, Hydrocele, Hæmatocele, Diseases of Testes and Scrotum. Surgical Diseases of the Female Generative Organs.

Diseases of Ano-Rectal Region. Fistula in Ano, Fissure, Stricture, etc. Congenital Deformities. Diseases of the Eye.

The course is illustrated by Diagrams, Plates, and Preparations from the Museum, and by reference to Cases under treatment at the Royal Infirmary. The second, or Practical portion is divided, so that the whole is embraced within the two Winter Sessions required by the College of Surgeons. Each Course concludes with a series of Practical Illustrations of the Operations in Surgery performed on the dead subject.

Dr. W. COLLES, *Dublin.*

Surgery.

A knowledge of the science of Surgery can be arrived at by reading and hearing lectures; by these two channels only can the student acquire his ideas of the general rules that have been established to guide the surgeon, —of the various theories proposed to explain the several phenomena presented to him,—of the classification of symptoms into diseases, and the plans of treatment deduced from the premises,—each mode of learning has its advantages which the other wants.

To many students of the present day, reading is a labour; they may read much without imbibing any idea from it. The majority confine their studies to manuals, which are often wrong in some portion; and at best, only give a succinct account of the knowledge of the present moment; the student knows not how it has been arrived at, or how to be further prosecuted; hence he is quite at fault when a new theory arises. If he read many authors, he is apt to become confused by the number and variety of the different theories and doctrines enunciated, and of the conflicting plans of treatment recommended.

It would, therefore, be useful to have a number of standard works named, which may occasionally be altered, and which the student would be expected to read.

Lectures.

The acquirement of knowledge by oral instruction or lectures is a more easy and a more natural means of receiving ideas.

The lecturer can give the arguments on both sides of the various theories and plans of treatment; also, the reasons which incline him to adopt one rather than the other. He can show the application of various remedies, the use of instruments, operations, which are with difficulty learnt from books; he can give more information in an hour's lecture than could be acquired in an hour's reading.

The attention of the pupil should be tested by occasional class examinations at uncertain intervals, as the lecturer cannot include all subjects to be treated of in one course of lectures of six months, three times a week; it will require two sessions to complete a course of Surgery; therefore the pupil should attend two sessions in his third and fourth years.

The performance of operations on the dead subject would also be useful, but the difficulty of obtaining a sufficient supply for the purpose might be an impediment to its general adoption; besides, we must recollect that there is a great difference between operating on the dead and living subjects.

The application of bandages, splints, &c., is to be learned while serving as dresser.

Hospital and Clinical Lectures.

The youngest pupil cannot go round any hospital without carrying away some knowledge, or making some observation; his eyes become familiar with the appearances of disease, he can practise his fingers in feeling tissues, fractures, &c. In a large hospital he has opportunities of comparing diseases apparently similar, yet distinct in reality, in different forms of the same disease, at the same time and in the same ward; thus, he learns to reason for himself: he can more readily understand all descriptions of books and lectures; hence he ought to attend hospital practice from the commencement of his studies; or, in the later years, should be obliged to take charge of some cases, write the history and progress, and dress and treat to the termination. He should also attend clinical lectures during his four years, —they can never be the same; there must always be some new observation made if the surgeon really makes the clinical lectures; applies the theories and rules of practice, diagnosis and treatment (learned from books and lectures), to a particular case before him; shows the difficulties in arriving at a knowledge of that particular case, whereby he adopts a certain course of treatment; they show him how the surgeon ought to reason on each case, things he ought to expect, and what dangers to guard against: hence, I should recommend that the pupil should attend hospital practice and Clinical Lectures for at least six months in each of his four years' study.

J. E. ERICHSEN, Esq., *London.*

I regret that the pressure of various professional engagements and occupations should have prevented my replying sooner to your circulars respecting the teaching of Clinical Surgery ; and I am sorry that, for the reasons above alluded to, I am still quite unable to enter into a discussion of the very important questions raised by you, to the full extent that they merit.

I must, therefore, briefly content myself with a mere statement of opinion thereon, and I would say—

1. That the present system of Medical Education is cumbersome and unpractical.

2. That to render it less cumbersome it would be necessary very materially to restrict the extent of the courses and the number of lectures given in each course, on all purely scientific subjects—such as Chemistry, Botany, and Natural History, and on all systematic subjects, such as Surgery and Medicine, that do not admit of demonstration. In fact, I should prefer making the first three subjects, viz., Chemistry, Botany, and Natural History, part of the preliminary education ; and I would limit the compulsory attendance of students in Medicine and Surgery to one course of not more than seventy lectures. I think it quite it as necessary to limit the loquacity of the teacher, as to compel the attendance of the pupil.

3. I would compel every student to attend to the art and practice of Surgery from the very commencement of his medical studies. There is a vast deal that can only be learnt in early life, and if neglected then can never be thoroughly acquired at a later period.

The art is to be learnt by attendance on out-patients, and by personal instruction given by the professor of Clinical Surgery, or by his assistants. I prefer the latter. Young men recently out of their pupilage know best the wants of their fellow students, and understand best the mode of supplying them.

Sir WM. FERGUSSON, Bart., F.R.S., *London.*

In answer to your communication of 6th August last, on the part of the Medical Council, I beg to state that in my opinion, the study of all of, and even more than, the ten subjects named in your paper is essential for the subject of Surgery and Clinical Surgery.

Although no notice is made of hospital attendance, I presume that it is deemed as important as any of the subjects referred to.

Whilst recognizing important distinctions between Surgery and Clinical Surgery, particularly in regard to the methods of teaching these subjects, I

am of opinion that they should be held as one and indivisible, and that a surgical education should not be deemed complete without due teaching in both.

Under the impression that point 2 refers to these two subjects, I consider that not less than three years should be devoted to their study, and that these should be the last three years of the four. I think that it would be advantageous were even the first year partly occupied by hospital attendance, but that strictly regular attendance, such as should be exacted in two of the subsequent years, should not be enforced. In the second and third years, attendance at lectures, hospital visits, and clinical teaching, should be rigorously required; whilst in the fourth year, the pupil—being still in attendance about the hospital, or at some other recognized source of education—should have a discretionary licence to study more thoroughly than before any subject of special interest in accordance with the bent of his mind.

In regard to point 3, still considering that "they" refers to Surgery and Clinical Surgery, I am of opinion that one course of lectures on Surgery should be strictly enjoined, and that if a second is not, an equivalent should be required in clinical instructions. The latter should, in my opinion, be continuous throughout the two years of enjoined strict attendance on hospital practice. In the other two years it should be recommended as an occasional source of value and interest.

The Medical Council would do well, in my opinion, to define what should be called a clinical lecture. No so-called lecture should be recognized as such, unless it be essentially clinical, *i.e.* delivered at the bed-side, or within reasonable distance from the patients whose cases are to be commented on. Lectures on one subject or more, which have no reference to subjects or cases immediately, or recently, under observation, should not be recognized, and lectures on the principles and practice of Medicine or Surgery, should be refused as clinical lectures. It is worth consideration whether the words clinical lectures should not be given up and clinical instruction substituted.

No written or read clinical lectures should be recognized. If a man cannot give clinical lectures and instructions without reading he should not be recognized as a clinical teacher. Something of a formal lecture may occasionally be permitted or enjoined, but teaching by brief remarks and demonstrations during visits, or on seeing patients and prescribing for them, should be represented and required as the essential quality of this kind of instruction.

As an equivalent for attendance on a recognized (or metropolitan) hospital, I should allow one year's attendance at certain smaller institutions, or with a practitioner with competent and recognized qualifications; and I entertain a strong opinion that this year should be the fourth instead of the first—due care being taken that, if in the fourth, the required lectures for medical education should have been attended at a recognized medical school.

CHRISTOPHER HEATH, Esq., *London.*

In answer to your circular letter respecting medical education, I beg leave to submit the following to the consideration of your Committee :—

In allotting the subjects for each part of the curriculum, more consideration should, in my opinion, be given to the fact that the bulk of medical students are intended for general practice. This implies that the majority of their patients in after life will be suffering from medical complaints, while at the same time they must be prepared at any moment—probably some years after quitting the hospital—to act boldly and skilfully on some critical surgical emergency where delay is impossible and surgical assistance inaccessible. It appears to me essential, then, that every practitioner should have a sound knowledge of practical and operative Surgery on starting in life, since his opportunities of gaining this, in the course of his daily routine are really *nil.* Under the present system the advanced students affect to despise Surgery as being common-place, and are attracted to the medical wards by the idea that the minute diagnosis of extraordinary cases there displayed will be of service to them in the treatment of the disorders of every-day life. They may occasionally look into the operating theatre, but more for the spectacle than for any practical study, and consequently men are sent into practice without having put up a fracture, and without having even amputated a finger on the dead body.

Taking four years as the period of study, I am sure that a part of every day must be devoted to hospital work, and the lectures, &c., should be arranged so as to leave two clear hours for the purpose. At my school (University College) so much stress is laid upon the study of Anatomy by the professor (who is not a practising surgeon) that the students are discouraged from attending the hospital at all during their first and second winters, with, I believe most disastrous results as regards their surgical education. I would confine the attention of the student during his first winter to surgical practice both out and in-patient. In his first summer I would let him attend the physician's out-patient practice, and at the same time attend a course of practical instruction in the application of splints and bandages. This would prepare him for taking an out-patient dressership in his second year, and when not thus occupied he should be attending the medical in-patient practice. In his second winter he would attend a course of systematic lectures on Surgery, and a second in his third winter. With this exception I would be content to give up third year's men altogether to the study of Medicine, provided they returned to the surgeries for the fourth year. They would then serve in-patient dresserships and become house-surgeons, and thus gain a familiarity with Surgery which they could not otherwise acquire. During the fourth summer the student should be syste-

matically taught to operate on the dead body, and thus the finish would be put, as far as practicable, to his surgical education.

With regard to systematic lectures on Surgery I believe they may be made most useful. If they are merely recapitulations of printed books they can hardly be popular; but if delivered from notes, with illustrations drawn as far as possible from the wards of the hospital, the pupils would appreciate them, and would treasure up sound rules of practice which would help them in after life. In my opinion no lecture should exceed three-quarters of an hour in length, and the remaining quarter hour should be devoted to an examinational *résumé* of the lecture, which would test the knowledge of the students, distinguish the attentive from the idle, and give practice in the mode of answering questions which would be most useful at the final examinations. Having, when Lecturer on Anatomy at the Westminster Hospital, followed this plan, I found it most satisfactory.

With regard to Clinical Surgery, I think it most advisable that in addition to formal clinical lectures and regular visits to the wards with the surgeons the pupils should be exercised in rotation in diagnosing before their fellows, most of the ordinary forms of surgical disease, as witnessed among out-patients. Owing to the number of patients he has to see, the assistant-surgeon has no time for much systematic instruction, although he may do his best to impart knowledge to his class, nor is he the officer paid and responsible for clinical instruction; the surgeon should, I think, exercise the class in the art of diagnosis and the dictation of a line of treatment, and for this purpose might draft off a few suitable cases from the out-patient rooms. Out-patient and in-patient dresserships should be made compulsory offices, and the former should qualify for the latter. The system of payment for dresserships, which still obtains in one large London hospital, should be abolished, and all clinical offices should be decided by competition.

PRESCOTT HEWETT, Esq., *London.*

In replying to the questions addressed to him by a Committee of the Medical Council, Mr. PRESCOTT HEWETT has thought it advisable to consult the Surgeons of St. George's Hospital as to their views upon the various points mooted in the questions; and in the answer herein given, the opinions of Mr. POLLOCK, Mr. HENRY LEE, and Mr. HOLMES, as well as those of Mr. PRESCOTT HEWETT are therefore embodied:—

1. The topics to be included under the subject of Surgery and Clinical Surgery, should in our opinion be these—(*a.*) Surgical Anatomy, healthy and

morbid ; (*b.*) the theory and practice of Surgery, as laid down in recognized text-books ; (*c.*) the diagnosis of surgical diseases on the living subject ; the examination of pathological specimens ; the taking notes of cases, and the practice of Minor Surgery.

2. The period of study for the practical part of the profession should embrace all the latter half of the four years, such study being equally divided between Surgery and Medicine ; Midwifery being attended either during the second year of study, or at the same time as Medicine and Surgery, as may be judged best.

3. We think that Surgery can best be taught by a combination of formal lectures on the theory and practice, clinical lectures on cases actually under observation, and practical instruction in the wards by the surgeon or his house-surgeon.

BERKELEY HILL, Esq., *London.*

Surgery.

Surgery should include the topics usually discussed in a systematic course of lectures on Surgery, but the course should be shortened—probably two lectures per week during the second winter would suffice. This curtailment would compel the lecturer to omit many varieties of surgical disease, or to greatly shorten his description of them. The parts most advantageously omitted are long descriptions of aneurism and similarly rare forms of surgical disease, which very seldom come under the observation of the ordinary medical practitioner. On the other hand, the lecturer should enter minutely into the principles of surgical pathology, such as the phenomena of inflammation, repair of injuries, and the resources of surgical art in controlling or aiding their recovery.

Clinical Surgery.

The teaching in this department should supersede much of that in surgical lectures. It should be more comprehensive than at present, and embrace a greater amount of tuition. The professor of Surgery should devote much of the time gained from the shortened surgical course to describing the various branches of Surgery in practical clinical lectures, illustrating them always with the cases under observation. He should announce the subject of his lectures beforehand (adapting them to the supply of material at hand), and insert in his announcement what book on the subject he will expect his pupils to have read, when he comes to discuss and explain to them the

particular class of disease under observation. This might take one hour and a half twice weekly. Once weekly the surgical lecturer should explain the miscellaneous cases which happen to be under observation, while he is proceeding more systematically through the field of Surgery. But in addition to instruction from a senior highly experienced professor, there should be a very efficient tutoring by junior men, who would follow their senior in his systematic teaching, and would also be charged with training the pupils in the use of surgical apparatus, and in the practice of minor operations. To accomplish this there should be several tutors to each professor. A certain number of students should be allotted to each tutor, who must be responsible for his pupils comprehending the instruction they receive both from the professor and himself.

When the four years have nearly expired, and the time for the student presenting himself before the licensing boards draws nigh, the student should be publicly examined by the professor of Surgery during his systematic clinical lectures. Thus the student would have his knowledge tested before it is too late to remedy mistakes, and those junior to him whose knowledge will be similarly tested the following season, would learn by his mistakes much better than by simply hearing questions of surgical pathology and treatment discussed before them. In the chronological arrangement of the student's work, no hospital attendance should be required till the student had passed the examination in Anatomy and Physiology. His time then should be divided between the medical and surgical wards, the out-patients' room, and the *post-mortem* theatre. In his third winter he should attend the systematic surgical and systematic clinical lectures, and be entered in a tutor's class. In his third summer he should be compelled to attend (as a dresser, or simple spectator) the surgical out-patients rooms, and be also under the charge of the tutor, who would be more at leisure to instruct him in the use of surgical apparatus. In his fourth winter he should be an in-patients' dresser, and also attend the systematic clinical lectures. In the latter part of the fourth winter he would be ready for the surgeon's *vivâ voce* examination.

Before the student's schedule is signed he should produce certificates of satisfactory attendance in the tutor's class, and in the surgeon's out-patient rooms, and answer the surgeon's *vivâ voce* examination in a satisfactory manner.

My acquaintance with the average of medical students leads me to think them usually much more familiar with the niceties of diagnosis in obscure and rare forms of disease than they are in the nature and treatment of common surgical or medical disorders. It is comparatively rare to find them skilful in treating chronic ulcers of the leg, in strapping and supporting

inflamed breasts, or strained joints. Perhaps in nothing is their want of familiarity with surgical appliances so well marked as in the use of catheters. With the amount of instruction the ordinary medical student is able to obtain in passing catheters, he is more liable in after practice to injure than benefit his patient when using these instruments.

HAMILTON LABATT, Esq., B.A., *Dublin.*

I have the honour to acknowledge the receipt of your communication of the 7th August, requesting my opinion on certain points of Surgical Education, with the view of arriving at the course of study which is necessary to enable the student to obtain the requisite knowledge and skill for the practice of his profession. In offering my remarks on this very important subject I shall be as concise as possible, and briefly state the views I have been led to entertain after an intercourse of some years as an instructor with numerous classes at the Royal College of Surgeons in this country.

Therapeutics, which may most advantageously be included under the subject of Surgery and Clinical Surgery, comprise the diagnosis and treatment of all diseases resulting from accident or progressive morbid action, requiring the aid of various local remedies and mechanical appliances for the restoration of parts to a healthy condition ; or the adoption of operative measures for the removal of structures which peril life, and which neither local nor constitutional treatment can restore to a normal state. Clinical Surgery should be taken as a distinct and separate department ; it is that knowledge which the student obtains by instruction at the bedside of the patient as the surgeon enumerates the leading and distinguishing symptoms of the diagnosis before him, and explains the treatment which is necessary for its relief. This is the true practical instruction, and it is lamentable to think how insensible the student is to its value. It is my full conviction that the Committee of the Medical Council will entirely fail in its objects unless some stringent measures are adopted not only to secure the regular attendance of the student in the hospital, but also his availing himself of the instruction afforded in it. The remedy is simple, and I shall presently give my views on it. The fault rests with the student himself, who too generally believes that by mere descriptions of the disease, as delivered in lecture-rooms, the reading of certain standard works, and the assistance of private instruction, or "grinding," as it is popularly termed, everything can be effected. No system can be worse than this, and yet it is the one in very general adoption. The result we all too well know. The student is sent out on the world to cure diseases he had never seen, and valuable lives are jeopardized by his ignorance. In making these remarks I by no means undervalue oral instruction, private study, or the assist-

anee of a private instructor; on the contrary, I consider them to be of the greatest value in assisting the student to arrange his ideas clearly on what he has himself seen and observed in the wards of the hospital, and in impressing on his mind the prominent and eharacteristic features of disease.

With regard to the period in a four years' course, when Surgery and Clinieal Surgery can be most profitably studied, and the length of time whieh should be devoted to them, it is my opinion that the student should not eommence hospital attendanee until the seeond year. During the first year he should be engaged in aequiring a competent knowledge of Human Anatomy, Elementary Physiology, Chemistry, Materia Mediea, Pharmacy, and Botany. After a year thus oceupied, he will be prepared to enter on his hospital studies without diffieulty or embarrasment, familiarized with subjeets to whieh repeated allusions will be made over the sick-bed. He will have acquired the requisite knowledge of the position, and natural condition of the various organs, whereby he will be enabled to recognize their abnormal and diseased states, and he will have an opportunity of deriving practieal experience of the effeets of the medicinal agents he had studied during the previous year.

I have given my opinion on the absolute neeessity for adopting some regulations whereby the due attention of the student to his elinieal instruetions would be secured and tested. I would not be satisfied with his mere attendanee in the wards of the hospital, but I would institute monthly examinations of the classes, on the eases whieh had been admitted into hospital, and thus test the diligenee and progress of the student in the pursuit of his hospital studies. I see no diffieulty whatever in earrying out this system. Some years ago it was adopted in one of the hospitals of this eity, and gave the greatest satisfaetion to the diligent section of the elass, but, attendanee not being eompulsory, it was deprived of the value I allude to.

The period required for hospital attendance by the various currieula has always appeared to me to be insufficient and inadequate for enabling the student to obtain the necessary knowledge of his profession. I therefore hope that this defeet will be taken into the serious eonsideration of the Committee, and that if any eourses of lectures, as at present required, be dispensed with, additional hospital attendance will be substituted.

Operative Surgery requires the serious eonsideration of the Committee. I do not think it has reeeived that attention whieh its great importanee entitles it to. The student whose first field of duty may be in a distant part of the eountry, and who may be called on suddenly to perform capita operations, ought to be prepared for such emergeneies. I, therefore, would require a full eourse of Operative Surgery. This should be deferred to the fourth year, when the student shall have acquired a thorough knowledge of General and Surgieal Anatomy.

My opinion on the eomparative value of lectures and praetical instruetion may be collected from what I have already stated.

J. LISTER, Esq., F.R.S., *Glasgow.*

The subject of Surgery and Clinical Surgery includes the Principles of Surgical Pathology and Practice, and the details of the various surgical disorders, with their treatment.

The general principles both of disease and treatment can, I believe, be taught to most advantage in a course of systematic lectures; while the details of special disorders can only be learned by long-continued study, practical as well as theoretical. Such details being more or less disconnected, may be gained independently of a continuous course of instruction, from clinical lectures, from observation of disease in an hospital, or elsewhere, and from private reading. Nevertheless, I am satisfied from experience that it is a valuable thing for the student to hear even the details of special affections and their treatment systematically discussed. The subject, however, is so extensive that it is impossible to do justice to the whole of it in a single six months' course, and I believe a good arrangement to be to vary the courses in successive years, the general principles being given thoroughly every year in the early part of the course, while special diseases are divided into two groups, each of which is discussed every alternate year. Thus the student, who almost invariably attends two courses, has placed before him a more or less complete view of the subject; and even should he attend only one course, he will be sure to be taught those general principles which systematic lectures can best convey. Even with such an arrangement the subject can hardly be fairly treated without lectures five days in the week.

For attendance upon such lectures the second and third winter sessions of a four years' course are, I believe, best adapted.

Clinical lectures will be valuable in proportion as they bring vividly before the student the circumstances of cases in progress of treatment; and I have no doubt that in this respect the system which has been long in process of operation in Edinburgh (where it was introduced by yourself*), and more recently in Glasgow—viz., that of bringing patients before the students in the lecture-room, is of the highest value. Clinical surgical lectures, when of this demonstrative character, may be attended by the student in almost any period of his course, and as they only occur twice a week, they do not interfere seriously with time which he ought to devote to other branches of study.

The personal observation of disease, and its treatment in the wards of an hospital, or elsewhere, is of the utmost importance, and may be commenced in the case of Surgery, at the beginning of studentship, since the facts of Surgery are many of them patent and appreciable without the pre-existence of much professional knowledge. Judicious remarks made by the surgeon at

* All these answers were addressed to Mr Syme, the Chairman of the Committee.

the bed-side are, I believe, of great value for directing the observation of the students, when their numbers are not too great to permit them to hear and see to advantage.

The holding of a dressership or some analogous office affords the student the best of all opportunities for clinical study.

With regard to the time that should be devoted to Surgical Hospital Practice, I am disposed to think that it should be continued to the end of the third winter session; the third summer, and fourth winter and summer being devoted exclusively to Physic, so far as hospital study is concerned.

Operative Surgery requires special instruction of a practical kind, and no man ought, in my opinion, to undertake the treatment of surgical cases without having made himself familiar with the performance of all the ordinary operations by practice upon the dead body, either under the guidance of some trustworthy text-book, or still better, under the supervision of a competent instructor.

Dr. G. H. B. McLEOD, *Glasgow.*

I beg to send you the following replies to the queries addressed to me by your Committee:—

1. "The topics which may most advantageously be included under the subjects of Surgery and Clinical Surgery."

I append an outline of the course of lectures on the Principles and Practice of Surgery which I am in the habit of delivering; I endeavour in that course to render as complete as possible the teaching of the subject entrusted to me. I do not think that a course more restricted in its scope would fulfil the design of the lectureship I have the honour to hold. As regards Clinical Surgery, I will take the liberty of making a few remarks afterwards.

2. "The period in a four years' course when they can be most profitably studied, and the length of time which should be devoted to them."

Ten years' experience as a teacher of Surgery has proved to me the impossibility and uselessness of attempting to teach Systematic Surgery in less than two Winter Sessions, and consequently I have been in the habit of dividing my course between two years.

It is my opinion that students should be compelled to attend Systematic Surgery for two Winter Sessions, and that a Summer Course of Operative Surgery should be required of them as well. The second and third, or third and fourth Winter Session would be the best period to study Systematic Surgery and the Operative Course taken in the intermediate summer.

Students cannot, in my opinion, derive any benefit from hospital attendance, or from clinical instruction, till they have had one course of systematic tuition, and become somewhat familiar with the principles on which the art of Surgery is founded, and the terms which are employed in its exposition.

It has always been inexplicable to me why a course of Operative Surgery has not been insisted on by the licensing boards. Without it I do not consider that students can obtain the requisite knowledge and skill for the efficient practice of their profession. The facilities in summer in many schools (notably in Glasgow) are so great, and the expense attending it so small, that no obstacle stands in the way but the student's neglect. By a course of Operative Surgery I mean, not merely careful demonstrations by the teacher on the dead body of the various operative procedures, but a deliberate repetition of these operations by the students individually, under the eye of the teacher.

3. "The manner in which they can be best taught."

I take it that systematic Surgery is best inculcated by lectures carefully arranged so as to give the utmost prominence to principles, and to lead the student on from the simpler to the more abstruse questions. Such lectures should be concise, clear, and delivered as much as possible without reading, so as to fix more surely the student's attention. All such teaching must be fully and largely illustrated by drawings, wax models, anatomical dissections, and pathological preparations, and if possible (and the opportunity should always exist, by the lecturer being at the same time attached to an hospital), by reference to actual cases in practice. It is occasionally in the teacher's power to show persons affected with various deformities to his class; and at times the relation of striking cases from his note-book, or medical literature, form useful resting points, and serve to illustrate the theory or practice described.

Surgical lectures should, in my opinion, be distinguished by a careful consideration of the pathology of the various affections; and what, if I may be allowed the expression, may be called the "natural history" of the disease, its usual progress and termination, when interfered with.

The student's knowledge and attention should be frequently tested by oral examinations, and occasionally by written exercises. It is seldom that a systematic teacher can be too elementary in his instructions, and I take it, that the inculcating, illustrating, and enforcing of broad, sound principles is essential, and of more moment than entering minutely into the details of treatment.

I have incidentally alluded to the advantage there would be, if the teacher of systematic Surgery were attached to an hospital. I believe such a union of offices to be almost essential to the efficient instruction of students. In this way the science and the art of Surgery would best find their legitimate exposition. The systematic teacher being necessarily kept up to the most

recent opinions, could bring his knowledge to bear on the illustration of the cases in the wards; and while he could correct and extend his own information, and test the truth of prevailing views, he would be accurate and minute in what he imparted.

In the above, I fear too long statement, I have, as nearly as possible, related the system of teaching I myself follow.

I have made but little allusion to Clinical Surgery, as it has as yet never been my duty to teach it, though the arrangements of the Glasgow School will soon impose that obligation upon me.

Clinical instruction, I think, should include careful bed-side tuition, in which the mode of examining injuries—the best method of putting questions, so as to elicit a clear history of the case—the sifting of that evidence and the balancing of facts, the drawing attention to the characteristic features of the case, and the interpretation of their significance, the education of eye and ear, and in short, the mode of forming a diagnosis and determining the treatment of a case, is to be taught and enforced. That all this should, in most cases, be done at the bed-side, does not in any way prevent such patients as can, without injury, be removed into the adjoining apartment (theatre) being there examined and prescribed for; on the contrary, it is often advantageous, and sometimes essentially necessary, that this be done, both because of the number of students attending the "clinique," and the undesirableness of making remarks on many cases in the presence of the patient, or even of his neighbours in the ward. Yet this variation in the strict routine is essentially bed-side instruction.

No clinical lectures should be delivered unconnected with the cases actually under observation, and such lectures should never be formal, or resemble those of a systematic course. The term lecture, in fact, should not be strictly applicable to them at all. Practical didactic comments on the cases under treatment, showing the influence of age, sex, habits, &c., on the individual, in changing or modifying the typical or abstract pictures of disease, drawn by the systematic teachers, and the treatment as a consequence; the tracing and explanation of complications and intercurrent affections. These all belong to the province of the clinical teacher.

If the patient, whose case is the subject of discourse, cannot be brought into the room used by the lecturer, he ought to be visited by the students before they come to listen to any comments, otherwise clinical teaching is no longer so but in name. It were, perhaps, well if the teacher had the power of selecting, during the season that he fills the office of clinical instructor those cases applying for admission into the hospital which were best fitted for his purpose, or to supply groups of special ailments which he wished to make the subject of his teaching.

The *post-mortem* room must also sedulously be made use of as a means of clinical tuition.

In conclusion I beg respectfully to state my conviction that the present period (four years) for professional education, is as short as it is possible for it to be made. It were well if a year or two more were added, so that a more deliberate consideration could be given to the different subjects, and especially to hospital attendance. I know that attendance in the wards is far from what it ought to be; that many students are but little seen there, and the means of verifying their presence is very inadequate, while from the crowd around the beds, but little can be seen or learned by the greater number. It would be well to consider whether some system could not be adopted of forming classes or groups of students of equal standing, which would alternately follow different surgeons, and see the cases under the charge of each. Bodily presence and mental attention could be thus better enforced, and a closer contact established between the teacher and the student. The physicians and the surgeons might well visit at different, but consecutive hours, so that the students could attend the practice of both. In all the schools, I believe the present system is most inadequate (as regards hospital attendance) to fulfil the end in view—the thorough practical instruction of the medical student.

Outline of Surgical Lectures.

1. Short sketch of the history of Surgery.
2. Surgical maladies common to all the tissues.
 - (*a.*) Inflammation and its consequences.
 - (*b.*) External injury. Wounds and their complications.
 - (*c.*) Virulent affections.
 - (*d.*) Tumours.
3. Surgical maladies of Tissues and Organs.
4. „ „ of Regions.
5. Principles of Surgical Diagnosis.
6. Surgical operations and bandaging.

J. MARSHALL, Esq., F.R.S., *London.*

Question 1.

All surgical injuries and diseases, excepting those of the eye and ear, diseases of the skin, and a few of those which are usually treated in the courses of lectures on midwifery.

The surgical operations, with the exception of those on the eye and ear, and a few of the operations of midwifery.

Question 2.

First Year.—No special surgical study; but occasional visits to the hospital may be *permitted*, provided that they do not interfere *in any way* with the elementary subjects then being studied. I am not sure that hospital visits should be *encouraged* in the first year, as they are apt to lead to waste of time. On the other hand, if they do not, as above said, interfere, *in any way*, with other studies, they might be permitted.

Second Year.—Practical bandaging and application of apparatus with hospital attendances (on out-patients especially), three months at a time, devoting the others to the medical wards, clinical lectures also.

Third Year.—Course of systematic lectures on Surgery, including surgical pathology in its general outlines, and surgical diseases and injuries of organs and regions of the body, as above limited; hospital practice regularly attended, and clinical lectures on Surgery also (in-patients and out-patients, including eye-cases); possibly, dissectorship duties.

Fourth Year.—Repetition of systematic course of lectures *optional*, but as a rule *most useful*, the student, perhaps, selecting only certain parts of the course. Dresserships now preferably held, but if already held, house-surgeoncies to be tried for. Clinical lectures and hospital practice constantly attended. Course of operations in Surgery gone through, including eye-cases.

After the fourth year, house-surgeoncies preferably held.

3. (*a.*) *Surgical Pathology.* Principles and rules of practice, as regards Surgical Injury and Disease. } Systematic Lectures.

(*b.*) *Bandaging and application of apparatus;* Practical Course, each Student doing everything himself. } Practical Instruction. Work as Dresser.

(*c.*) *Clinical Surgery* { Out-Patient Practice. Care of Out-Patients. In-Patient Practice. Dresserships. Clinical Lectures in Wards „ „ in Theatre.

(*d.*) *Operative Surgery* { Practical Class, each Student doing everything.

Remarks.

1. I have not paid special attention to the modes or courses of education in Medicine and Surgery; but have rather tried to do my best in my prescribed duty and offices.

2. I feel that every scheme must be open to correction on the part of its author, after conversation with others. Hence I do not think a sketch of mine, or of any one else, should be regarded as the final opinion or view.

3. I find that any scheme, however firmly adopted, should have some pliancy in it, to suit individual wants or necessities.

CAMPBELL DE MORGAN, Esq., F.R.S., *London.*

The questions referred to relate specially to the best mode of teaching Surgery systematically and clinically.

1. The answer to the first part of the first question, viz., as to "the topics which may be best included under the subject of Surgery," must, I think, be determined in great measure by the length of time which the student will be required to devote to it. Assuming that he must attend for two years, and that he will be expected to acquire knowledge by the aid of systematic instruction, I think that it is very desirable that the two courses of instruction should not be mere repetitions of one another, but that some of the subjects should be taken up in one year, some in the other. It has always seemed to me, too, that time is wasted by lectures being devoted to the same subject in the courses of both Medicine and Surgery. Where the two teachers happen to take different views, this may prove otherwise injurious. Such subjects, for example, as the pathology of inflammation, of scrofula, of cancer, &c., would find their proper place in courses of General Pathology.

On the plan here suggested full time would be available for going fairly into all subjects generally embraced under the head of Surgery, including diseases of the eye and ear, of the skin, deformities, Plastic Surgery, &c. The teachers should endeavour to instil a knowledge of the principles which must guide the student.

Operative Surgery should be learnt by the student practically. A great many operations—such as for ligature of arteries, hernia, stone, &c.—can be taught and practised in the *post-mortem* room to a much greater extent than is at present done.

While in the systematic teaching the principles of Surgery should form a large part of the subject matter, in Clinical Surgery the teaching should be as purely practical as possible, and should have reference solely to the cases

which are or have been under the student's eye. It seems to me an error to give an exhaustive dissertation on a special disease under the name of clinical lecture.

One great object of clinical teaching should be to enable the student to form a correct diagnosis. Every student should be obliged to undergo practical examination; and he should be required to study Pathological Anatomy in the dead-house, especially on those cases which he has observed clinically. Every student, too, should be obliged to dress, &c.

2. The time during which Surgery should be studied should be the two last years of studentship. Nor should the subject be regularly entered on until after the student's knowledge of the preliminary subjects of Chemistry, Physics, Anatomy, Physiology, and Materia Medica has been tested and approved.

The two years should include two full Winter and two full Summer Sessions, or nine months in the year.

It would be well, however, that the student should familiarize himself with the appearances and nomenclature of disease before he enters on the regular and systematic study of it.

Of course the whole of the two years could not be given to Surgery alone —Medicine, Midwifery, General Pathology, and perhaps Medical Jurisprudence and Hygiene, must occupy a considerable portion of this time.

3. This is the question on which there will be the greatest difference of opinion.

My belief is that the lecturing system has been carried too far. It was the best mode of teaching, perhaps, thirty or forty years ago, when books were not so available to the student as at present, and when the lecturer could, from his personal experience, tell more than could be readily found elsewhere. It may be, perhaps, the only practicable way of teaching very large classes. It may be the best, perhaps, in some exceptional cases, when the lecturer possesses unusual powers of arresting the student's attention.

In most cases, I believe that the student can be better taught, and can be made to think more for himself, which is one of the greatest objects of education on the tutorial system.

Under any circumstances, I think it would be better if the mode of teaching were left more to the discretion of the teacher than is the case at present; and I would suggest, too, that any certificate that may be demanded should be to the effect that the student has pursued the subject to the satisfaction of the teacher, rather than that he has attended a certain number of lectures.

I am satisfied that the less the teacher is trammelled as to the mode in which instruction is to be imparted, and the more the knowledge which the student has acquired is tested by strict examination, both during the period of studentship and at the final examination, the better will be the educational

results. The present certificate system I have always regarded as demoralizing both to student and teacher.

The more personal plan of teaching would, of course, impose more labour on the teacher. It may not be worth a man's while to undertake such a task; but if he does undertake the training of medical students, he should be prepared to adopt any plan that may be found conducive to the highest results.

J. PAGET, Esq., F.R.S., *London.*

The following seem to me the most important general rules for the teaching of Surgery and Clinical Surgery to students intended for the medical profession:—

The surgical practice of an hospital, whether among in-patients or out-patients, should be attended every day during the whole term of study, unless when interrupted by dissections that cannot be postponed or by attendance on medical practice.

Arrangements should be made that every student may act as dresser, and take cases for at least three months.

The systematic lectures on Surgery should be given in courses of from fifty to sixty. They should deal with general principles and with the larger groups of injuries and surgical diseases, and all the smaller details of surgical pathology and practice should be left for clinical lectures or for teaching in the wards.

Each surgeon of an hospital with a school should give a clinical lecture once a week on cases observed during that week, but students should not be required to obtain certificates of having attended more than one clinical lecture in each week.

Conversational teaching should be carried on at all visits of patients, in the operating-theatre, and wherever else it may be useful.

The operations should be taught more fully than I believe they usually are in the systematic courses of Surgery; and in large schools there should be demonstrators of Operative Surgery, by whom operations, bandaging, and the use of instruments should be taught, and who should hold the same relation to the lecturer on Surgery as the demonstrator of Anatomy usually does to the lecturer on Anatomy.

The working of these rules should be conformed, so far as it may be possible, with the general plan that in the first periods of study the chief attention should be given to Anatomy and Physiology, and in the later periods to surgical and medical practice.

The study of Surgery by those who are destined for general practice should not exclude an equal study of Medicine. For those who intend to practise Surgery alone, the plan of study should be as for general practitioners during the ordinary period of four years' study; after this the study of Surgery alone may be continued.

I think it greatly to be desired that every possible inducement should be offered to students to acquire such knowledge as they need of Chemistry, Botany, or other natural sciences, in their preliminary education. The necessity of learning these in medical schools is a very serious hindrance to the more important and practical parts of medical and surgical study.

Dr. PIRRIE, *Aberdeen.*

In reply to your communication of the 7th August last, I have the honour to state, for the information of the Committee of the Medical Council, that my opinion on the points submitted for consideration is as follows :—

1*st.* Under Surgery should be comprehended the principles, practice, and operations of Surgery; while Clinical Surgery should consist of instruction on all cases capable of affording information which come under treatment in an hospital.

2*nd.* Two Winter Courses of Surgery (attended during the second and third years of study), and six months of Clinical Surgery (attended during the third year), are deemed by me to be necessary

3*rd.* The lectures on Surgery should include a clear and comprehensive account of the principles, and those on the practice and operations of Surgery should be as demonstrative as possible. Every object and proceeding referred to should, wherever practicable, be shown as well as described. When knowledge is not thus addressed to the eye, as well as to the ear, more than half the advantage of lectures on Surgery is lost.

G. H. PORTER, Esq., *Dublin.*

I must apologize for not having ere this answered your letter of the 7th August, which I received, but it quite escaped my memory. I now have much pleasure in doing so.

In reply to the questions I would say—

1. Inflammation and its consequences—injuries—operations.

2. Four years' attendance upon hospital practice, instead of three sessions of nine months.

3. Bed-side teaching, accompanied by catechetical instruction in the ward; the exhibition of surgical apparatus, or models of such, with their application.

I may add that I do not consider a course of lectures on Surgery in a school theatre of much value, the wards of an hospital being in my opinion the best place to learn in.

WILLIAM S. SAVORY, Esq., F.R.S., *London.*

(Answer already given under "Anatomy and Physiology.")

JOHN SIMON, Esq., F.R.S., *London.*

1. My answer to the first question must consist chiefly in negative suggestions.

(*a.*) It has long appeared to me, and my opinion on the point has grown stronger from year to year, that a good deal of time is wasted in our medical schools, and also often much confusion caused, by lecturers on Surgery and lecturers on Medicine both considering themselves required to teach such general parts of Pathology and practice as are common to both branches. Opinions may differ as to the best mode of dealing with this fault. If I were myself organizing a medical school, I should prefer that neither "Surgery and Clinical Surgery" on the one hand, nor "Medicine and Clinical Medicine" on the other, should include those general parts; but rather that a short separate course, introductory to both branches, should be given on General Pathology and General Therapeutics, and that Surgery and Medicine should include only the matters which are distinctly surgical or medical.

(*b.*) A good deal of needless overlapping of courses also often occurs, but ought, as far as practicable, to be guarded against in the border-lands of Surgery and Anatomy—the surgical lecturer, on certain points, talking much more Anatomy than ought to be needful; and the anatomical lecturer, *en revanche*, expatiating very unnecessarily on the surgical applications of Anatomy. It seems to me that in a well-managed school there should be a concordat between these two lecturers, fixing who is to be really responsible for the teaching of Surgical Anatomy, and that vain repetitions by the other of them should be excluded.

2. The period in a four years' course when Surgery can be most profitably

studied is, I think, obviously after Anatomy and Physiology have been learnt, and therefore generally after the expiration of the second year. The requisite studies of Surgery cannot, I think, under ordinary circumstances, be compressed into less than two years' diligent attendance on practice; but during such two years Medicine and Midwifery can commonly also be studied, provided that Surgery be allowed not less than about two-fifths of the entire time.

3. So far as Surgery can be taught by practical instruction on actual cases as they arise, this mode of teaching is, in my opinion, immeasurably superior to teaching by systematic courses of lectures; and no clinical school ought to be so deficient in practical opportunities as to require that those best sources of instruction should be very extensively supplemented by others of a different kind. Undoubtedly, however, some systematic study is necessary—not only because of possible deficiencies of clinical opportunity, but also for the mere sake of system, as such, and in order that the student may see something of the relation of parts of Surgery to one another. But it must be remembered that this systematic view of the subject is not procurable only from oral teaching, but can be got also from books; and a fixed requirement that students must attend systematic courses of lectures, purporting to go, non-clinically, through the entire subject-matter of Surgery, is, I think, to be deprecated.

The best practical teaching of Surgery is, I think, such familiar instruction as an hospital surgeon can give to his dressers and house surgeons in connection with their daily functions. Of course, not every pupil can come into this intimate relation with the principal teachers of his school. But the method of teaching from cases is, in my opinion, so incomparably superior to all other methods of teaching that the out-patient practice of hospitals and dispensaries and the services of junior officers ought, I think, to be utilized in this direction.

Besides these answers to the three questions, the only further suggestion I would submit is that, in such matters as are referred to, different schools might, I think, advantageously have great latitude allowed them to adopt different plans of education. Particularly, I would urge this with regard to the arrangements for systematic courses of teaching on such subjects as Medicine, Surgery, Midwifery, Materia Medica, and Forensic Medicine. It is one thing to require that these things shall be known by the candidate; it is quite another thing to require that they shall have been learnt in any one particular way. Provided the arrangements for practical instruction in a school were amply sufficient, and provided the examinations of licensing boards were so conducted as thoroughly to test the knowledge of candidates, the arrangements for systematic courses of lectures in the school might, I think, safely be left to be regulated by the common laws of supply and demand.

JAMES SPENCE, Esq., *Edinburgh.*

1. "The topics which may most advantageously be included under the subjects of Surgery and Clinical Surgery."

This question brings out indirectly one great distinction between systematic lectures on Surgery and Clinical Instruction properly so called.

In the former the teacher can arrange the topics which he considers can be most advantageously taught in the course. In Clinical Surgery the teacher cannot do this. The topics of his lectures must depend on the cases which present themselves for observation and treatment in the hospital during any particular course.

Systematic Surgery.

A course of instruction on the Principles and Practice of Surgery should include a consideration of—

(*a.*) General Principles.

(*b.*) Special Surgical diseases and injuries with their treatment.

The order in which I have hitherto arranged the topics taught in my own lectures will be seen in the following table taken from the University Calendar :—

SURGERY.

PROFESSOR SPENCE.

I.—Inflammatory Process and its Results—

1. Suppuration—Abscess—Sinus and Fistula—Pyemia. Ulceration—Ulcers—Sloughing Phagadena. Mortification—Traumatic and Chronic. Special Forms of Inflammation : Erysipelas—Carbuncle.
2. Abnormal Nutrition—Tumours—of the Soft Parts—of Bone.
3. Wounds : Incised, punctured, lacerated, gunshot, poisoned—Burns and Scalds—Tetanus.
4. Syphilis.

II.—Diseases and Injuries of Particular Tissues—

1. Diseases of Bones and Joints—Injuries of Bones and Joints—Particular Fractures and Dislocations, and their Treatment.
2. Diseases and Injuries of Vascular System—Of Veins : Phlebitis—Varix—Of Arteries : Wounds—Hæmorrhage and Hæmostatics—Arterial Degeneration—Aneurisms in general—Special Aneurisms, and their Treatment—Operations for Ligature of different Arteries.
3. Injuries and Diseases of Muscles and Tendons—Tenotomy for Malformations.
4. Amputation and Excision of Joints—Special Amputations and Excisions.

III.—Regional Surgery—

1. Head and Neck: Injuries and Diseases of Air-Passages requiring Surgical Treatment—Tracheotomy—Laryngotomy—Injuries and Diseases of the Pharynx and Œsophagus—Removal of Foreign Bodies—Surgery of the Mouth and Face. Excision of the Upper and Lower Jaws—Injuries of the Head—Operation of Trepan.
2. Thorax: Injuries—Fracture of Ribs—Wounds—Emphysema—Pneumothorax—Hæmato-thorax—Hydrothorax and Empyema. Paracentesis thoracis.
3. Wounds of the Abdomen—Hernia—Special Herniæ, and their treatment.
4. Injuries and Diseases of the Genito-Urinary System, and operations required for their treatment.
5. Diseases of the Rectum.

Tutorial Classes for the practice of Bandaging and Surgical Appliances, by the Pupils of the Class, are conducted by a Demonstrator, under the Superintendence of the Professor.

But whilst all these topics must be included in a full systematic course, I consider that some of them should be treated of much more succinctly than others, by oral instruction in the lecture-room. That less time should be given to the investigation of recondite theories of diseased action, which are better suited for home study, and that more time should be allotted to topics which admit of demonstration and illustration. In all departments of surgical lectures this can be carried out more than in most subjects.

As regards general principles—In Surgical Pathology a large proportion of diseases are so situated that their phenomena can be recognized by the senses, and hence the lecturer can treat of them more succinctly and perhaps more practically by directing the student's attention to the more obvious changes in appearance and structure, rather than by entering on an elaborate discussion of theories or of minute changes in ultimate structure. On these last mentioned subjects I hold that the lecturer should rest satisfied with making suggestions to the student for private study, stating, however, the reason, so that students may not be led to suppose that these subjects are not important in themselves.

The value of systematic lectures in reference to the Practical Surgery of special diseases can hardly be overrated, provided that the lecturer has himself had practical experience in Surgery. For from his own recollections he can, with the aid of morbid specimens, casts, and sketches, illustrate the characters, appearance, and symptoms of Surgical diseases far more impressively and distinctly than any book-study can possibly do. Whilst in regard to Operative Surgery the student will gain more knowledge of the operation than even in the operating theatre, for in the lecture-room the teacher can explain, step by step, what is necessary to be done, whilst in operating on the living this course cannot with propriety be pursued. These same remarks apply to instruction in the use of surgical apparatus, and the art of bandaging.

But whilst I show these in the lecture room, and explain the principles of their use in the treatment of special injuries and diseases, yet I do not rest satisfied with this. I have ever since I taught Surgery, given my classes facilities for practice in these departments. At present I have for this purpose special bandaging classes. The Surgery class is subdivided into sections numbering from ten to fifteen each. These sections meet on different days either at 9 A.M. or two P.M. as best suits the students in the different divisions, and each member is thus afforded opportunities for applying the bandages and apparatus on a lay figure under the superintendence of a demonstrator.

Experience has taught me to limit the instruction to those forms of bandage and apparatus which are more ordinary and useful, so that these shall be thoroughly practised and mastered by the students rather than that their time should be spent in trying all the forms described and figured in manuals on bandaging.

These practical classes are free to all the students attending the lectures on Surgery.

Practice of Operative Surgery.

Every one must admit the importance of the student practising operations on the dead subject under the superintendence of his teacher. Yet it has never been an imperative subject of study in this country, and, indeed, unless the supply of material was greater, and certain changes made with regard to practical Anatomy during summer. Operative Surgery could hardly be enforced. I at present have a course in summer, but the numbers who attend are limited, and I feel a difficulty in urging students to take the course lest I should not be able to supply all with subjects for operation. I conduct the class personally, and the pupils are taught to arrange their instruments methodically, and place their assistants as well as to operate. In very large classes, however, such a plan would hardly be possible. The method would require to be modified, for even with a small number much time is needed to carry it out thoroughly.

Proposal to divide the Systematic Course into two four Months' Courses, and Reasons for making this Proposal.

In the preceding answers as to the method I consider best for conducting a course of systematic Surgery, my statements have reference to the present plan of six months' courses. After eighteen years, however, of experience in teaching Surgery, I believe that, instead of one course of six months, it would be an improvement if the subject were taught in two four months' courses—junior and senior classes, in fact, as most subjects are taught in the arts faculty.

There are very few, if any, students who do not take a second course of Surgery, and the lecturer under the present system must always feel the difficulty of conveying information to students of different degrees of advancement. The plan I propose would enable him to introduce a higher kind of teaching, better adapted to advanced students.

So much have I felt this necessary that, as will be seen from the following prospectus of my lectures in the University Calendar for the approaching session, I have made an alteration in my former plan.

Surgery.

PROFESSOR SPENCE.

The course comprises:—

1. THE CONSIDERATION OF THE GENERAL PRINCIPLES OF SURGERY.

Inflammation and its results; suppuration, ulceration, and mortification; tumours, wounds, burns, scalds, &c.

This first division will be conducted partly by lectures and partly by oral examinations on subjects prescribed for study.

2. PRACTICE OF SURGERY.—During 1868-1869 the greater part of the session will be devoted to this second division, which consists of the illustration of the general principles in reference to special diseases and injuries of particular tissues and organs in different regions of the body.

1. Diseases of Bones and Joints.
2. Diseases and Injuries of Blood Vessels, Special Aneurisms, and the Operations for Ligature of the different Arteries.
3. Amputations and Excisions of Joints.
4. Injuries of Head and their Consequences; Operation of Trepan.
 SPECIAL LECTURE.—Analysis of the works of Pott, Abernethy, and Bell on Injuries of the Head, in relation to modern doctrines and practice.*
5. Tumours of Face and Neck.
6. Injuries and Diseases of Air Passages, Tracheotomy, and Laryngotomy.
7. Injuries and Diseases of Pharynx and Œsophagus; Removal of Foreign Bodies.
8. Surgery of Mouth and Face.
9. Fracture of Jaw.
10. Excision of Upper and Lower Jaws.
11. Fractures and Dislocations occurring in Upper Extremity.
12. Thorax: Injuries—Fracture of Ribs—Wounds—Emphysema—Pneumothorax—Hemato-thorax—Hydrothorax and Empyema. Paracentesis thoracis.

* This feature of the Course will, so far as time permits, be carried out in regard to other diseases and injuries, so as to direct the Student's attention to, and encourage the study of standard Surgical Authors.

13. Wounds of the Abdomen—Hernia—Special Herniæ, and their treatment.
14. Injuries and Diseases of the Genito-Urinary System, and operations required for their treatment.
15. Diseases of the Rectum—Dislocations and Fractures of Lower Extremity.

Tutorial Classes for the practice of Bandaging and Surgical appliances, by the Pupils of the Class, are conducted by a Demonstrator, under the superintendence of the Professor.

How far this trial may be successful remains to be seen, for I know there are difficulties under the present system. But the plan will show somewhat of the object I have in view, and I believe that object could be effected fully both in regard to Surgery and some other subjects of medical education by means of four months' courses.

Clinical Surgery

Should consist of two departments.

1. And most essential. The observation of disease at the bed-side of the patient; the surgeon directing the students' attention to the condition and symptoms of the patient, and teaching how to examine cases, and how and what to observe, and directing them to note any special symptoms he may wish to refer to in his lectures.
2. Lectures on cases in the wards, or on cases of patients presenting themselves for advice at the hospital.

Such lectures are of great importance, as enabling the clinical teacher to enter more fully into the details of the cases, and to render his instructions more complete.

The observation of disease, and the remarks of the clinical teacher at the bed-side, are no doubt most valuable to the student, and should, I think, form the great feature in clinical teaching. The surgeon, however, can scarcely—with due regard to the feelings of the patient, or without risk of being misunderstood, and perhaps alarming the patient—enter fully into details as to prognosis if that be unfavourable or doubtful, or discuss the proposed treatment, especially when an operation is necessary. This very important instruction the clinical lecture enables him to communicate effectively. Still the lecture should be subsidiary to the proper clinical instruction in the wards.

I am aware that there are difficulties to be overcome in making the bed-side instruction really available to the student, because where a number of students crowd round a bed only a few of them can see anything, and that under circumstances of great discomfort. Still, having had upwards of eight years' experience in teaching Clinical Surgery in the Edinburgh Royal Infirmary, I know that by careful organization such difficulties may be greatly obviated.

If the students be arranged in sections, and directed to place themselves around different beds on different days, instead of vainly trying to see each patient in the wards every day, they will gradually become acquainted with every case, without discomfort and with greater advantage. The great disturbing element to this plan arises from students not belonging to the clinical class having the right of attending all wards, in virtue of their hospital ticket; and I doubt whether it would be proper to prevent this. Only those who do accompany the clinical teacher through the wards should be obliged to comply with the visit-rules he has organized.

During the time I taught Clinical Surgery, I used to arrange that sections of the class not exceeding twelve should in rotation have the opportunity of accompanying my house-surgeon at his evening visit, and advised that their attention should be specially directed to the general state of the patient, the character of the pulse, &c. I consider this most important, as, in a surgical clinique, the local disease, injury, or operation is apt to attract attention, to the exclusion of the constitutional symptoms and general treatment.

NOTE.—Cases which can be brought into the theatre are shown to the students during lecture, and in most courses the students are examined occasionally in practical diagnosis of cases, and as to the treatment they would think it right to adopt.

2. "The period in a four years' course when they can be most profitably studied, and the length of time which should be devoted to them."

I think that the course of Systematic Surgery should be taken in the second Winter Session, and should precede the clinical lectures, but not hospital attendance; that the clinical lectures should be attended during the summer of the Second Session and the following Winter Session.

My reasons for this opinion are, that unless the student begins to attend Surgery in his second year he will lose, in a great measure, the benefit of hospital attendance: whilst his anatomical studies have, in a great measure, prepared him for following surgical lectures. I think the systematic should naturally precede the clinical lectures, so that the student, from his knowledge of surgical principles, may be prepared to derive the full benefit of the clinical instruction.

Without this knowledge a junior student at a clinical course is very apt to take up false notions, from his liability to misunderstand the lecturer—to mistake, for example, the practice adopted in some special case for the general rule of practice. It is stated that the great value of clinical instruction is, that the student has the cases before him, and can judge for himself. It must, however, depend on the amount of his previous knowledge of surgical principles how far he is able to form a correct judgment. In the natural sciences, the observation of *facts*—supposing these to be evident and ascertained—is of little importance in comparison with the deductions drawn

from them ; and I believe that a student, instead of forming an independent judgment, is quite as likely to be influenced by the opinions of his teacher in a clinical as in a systematic course of Surgery.

I repeat that, for these reasons, I consider that the systematic should precede the clinical lectures ; that the clinical should be commenced in the summer following the second Winter Session, and continued during the third Winter Session. After this the student would require to begin his attendance on the medical wards. Of course, if his other studies and time permit, the more he sees of hospital practice so much the better.

As regards systematic Surgery, though only one six months' course is required by many licensing boards, yet, in point of fact, there are very few students who do not voluntarily take a second course, and it is in view of this that I suggested the change in regard to systematic Surgery in my answer to the first question.

3. "The manner in which they can be best taught—by lectures, practical instruction, or otherwise."

My answers to the previous questions almost suffice to answer this, as they show that I consider both lectures and practical instruction to be necessary for the proper teaching of Surgery, and indeed of almost every branch of medical science. There is always a tendency in regard to medical education, as well as other fashions, to go from one extreme to another. At one period hospital attendance used to be sarcastically alluded to as "walking the hospitals." Then came a time when the licensing boards, with the view of raising the status of the profession, increased the number of classes required —many of these classes being designed for the purpose of imparting instruction in the collateral sciences rather than purely professional information. And now the recoil from that system of over-lecturing has carried opinion to the opposite extreme, in favour of what is called "practical instruction." I say *called*, because names do not always correctly indicate things. I will yield to none in my estimate of the value of hospital attendance and practical instruction, properly understood ; but if it be meant, as is often insinuated, that systematic lectures are useless as a means of conveying practical instruction, then, as a practical hospital surgeon, who has had experience in teaching both systematic and clinical Surgery, I deny the correctness of the statement, and affirm that lectures can be made a valuable means of conveying practical instruction, if they be made demonstrative and suggestive, rather than exhaustive ; and that, in regard to certain subjects such as Surgery and Medicine, they are necessary for the student.

In Surgery, for example, it is a great mistake to suppose that clinical or hospital instruction can supersede systematic teaching. The range of surgical disease is large, and some forms of it are of rare occurrence, so that even in a lengthened hospital attendance the student may never meet with certain

kinds of accident or disease; yet, so irregular are these in their occurrence, that, immediately on entering into practice, he may be called upon to diagnose and treat them.

Even in certain forms of surgical disease which are of common occurrence the general student may seldom have an opportunity of witnessing the most important stages in their progress, or the operations necessary for their relief. Thus, for example, in strangulated hernia, or in diseases of the air-passages requiring surgical relief, the very urgency of the case demands that the operation should be performed at once, and that very generally at times not corresponding to the hour of hospital visit. Although I have, perhaps, performed the operation for strangulated hernia, and also tracheotomy, more frequently than most surgeons, and although many of these cases have occurred in hospital practice, yet I do not think I have performed either operation above a dozen times at the ordinary hour of visit. Hence the necessity of making the experience of the surgeon available to the student, in order that he may be prepared for any emergency or contingency by a thorough course of systematic instruction, conducted in the manner which I have indicated.

As I have replied very fully to the questions in regard to Surgery, I cannot enter on the general question of medical education, although from various circumstances it is one on which I feel a great interest and have strong convictions.

I will only say that my views point,

1. To re-arranging the terms of study, substituting four months for six months courses.
2. To subdividing some classes into junior and senior, as is done in the Arts Faculty, so that teaching might be simplified to the junior student, a higher kind of teaching introduced for the senior student, and much repetition prevented.
3. In regulating the order of attendance on the courses required, so that certain subjects which are means to an end, should be studied first, to prepare the student to follow intelligently the courses of instruction on the great practical subjects of Medicine and Surgery.
4. As to the question of examination,

The general principles on which examinations should proceed are, I think, simple, and may be classed under three heads :—

1. They should have a relation to the means of instruction afforded to the student. We have no right to expect more from him than he is taught, and therefore it seems clear to me that equal means of imparting instruction should be demanded from all recognized teachers in order that the examination for the same qualification should be uniform.

2. In arranging the order in which the different subjects of the curriculum are to be examined on, those sciences which form the foundation of Medicine and Surgery should be taken in the earlier examinations; whilst the practical departments of Medicine and Surgery should constitute the subjects for the final examination which tests the fitness of the candidate to enter upon practice.
3. Examinations ought to be complete and testing, in proportion to the value of the qualification to be awarded so as to maintain that value.

Whilst, however, I think examinations should be searching, and that we have a right to expect from the candidate such a knowledge of great general principles and their application, and also of ordinary surgical manipulations as shall enable us to certify that he is fit to practise intelligently and safely, we have no right to expect him to be possessed of that peculiar tact in diagnosis and treatment of disease which experience alone can give. Any medical man who reflects how gradually he has himself acquired this kind of practical knowledge, will best estimate the folly of expecting it from a candidate at his examination.

Dr. TANNER, *Cork*.

I strongly advocate a good preliminary education in arts for medical students, and that a university degree should command every advantage. A four years' course devoted to the study of Medicine is the shortest period which should be recognized for obtaining the requisite knowledge to practise Surgery, during which period there should be attendance on three courses of lectures on Anatomy and Physiology, and on Practical Anatomy, two on Chemistry, and one on Practical Chemistry, two on Botany with Herbonizations and Zoology, and two on Materia Medica; two on the theory and practice of Surgery, one on the theory and practice of Medicine, one on Midwifery, and one on Medical Jurisprudence; also three years' hospital attendance, with clinical lectures, and one course of Operative Surgery. I strongly recommend a requirement that all lectures should be largely illustrated, with diagnosis, plates, specimens, wax models, &c., &c.; and also that there should be but three examining bodies—one in London, one in Edinburgh, and one in Dublin—with perfect uniformity of each, and to grant first and second-class diplomas. I believe the more the *status* of the profession is raised by requiring its members to be well educated the more will seek to enter it.

T. PRIDGIN TEALE, Esq., *Leeds.*

Question 1.

Surgery and Clinical Surgery to include practical training in Operative Surgery and minor surgical manipulations, not as optional, and separate, but as essential portions of the surgical course. This may be carried out without increasing the already too numerous courses of lectures.

Question 2.

Two years to be devoted to the surgical course, the student having the option of beginning the course either in his second or in his third winter. The most desirable plan is perhaps for the student to begin his attendance on the surgical hospital practice in his second winter, and to devote his third and fourth winters to the systematic surgical course. By attending the hospital practice in his second winter his interest in anatomical work is rendered more keen by seeing some of the practical bearings of his dissecting-room work ; and by deferring the special study of Systematic Surgery till the third and fourth winter, he does not overload with formal lectures the period when his time is most occupied with dissections and with preparation for the anatomical examination.

Question 3.

All surgical teaching to be grouped round Clinical Surgery, as all anatomical teaching is subordinate to the dissecting room.

This idea may be to some extent realized by the following scheme of teaching which is aimed at, though as yet not fully carried out, at the Leeds school.

I.—Teaching of Clinical Surgery.

(A.) *Division into Clinical Classes.*

The surgical pupils of the hospital to be divided into classes, a class being assigned to each surgeon, to attend him at his visits to the wards, during operations, at *post-mortem* examinations of his patients, at his out-patients—in fact to watch from beginning to end his practice for three months. The classes to change hands every three months.

Every student would thus see thoroughly the practice of each surgeon in rotation twice, or perhaps thrice, during his pupilage.

(B.) *Compulsory Hospital Attendance.*

The roll of the clinical class to be called at each visit to the wards as the student is under this plan relieved from attendance upon more than one

of the surgeons, it is not too much to require the attendance on that one to be as compulsory and as regular as a lecture.

I consider such subdivision of the hospital class to be essential to any improved plan of clinical teaching. The plan has been carried out in the Leeds Hospital for three years. With the starting point of a regularly attending, non-varying class, the surgeon can commence systematic clinical teaching, which on the old system of promiscuous attendance on the practice of all the surgeons at once was impossible.

(C.) *Catechetical Teaching.*

At the end of each visit to the wards the surgeon may retire with his class to the theatre or other room apart from the wards, and spend twenty minutes in catechetical teaching from some case just seen in the wards. Notes of such a case may be read by the clerk or dresser, and taken down by the class. If one good point of Surgery could be well, vividly, taught at each clinical visit, how much would be learned in two such years—more, perhaps, than is ever picked up and retained from a course of formal lectures.

(D.) *Clinical Lectures.*

With thorough clinical teaching clinical lectures would be less essential than now, and might be given from time to time at the discretion of the surgeon, and might be reserved for subjects of special interest, rarity, or novelty.

II.—Teaching of Systematic Surgery.

The systematic course of surgical lectures would be relieved in proportion as the clinical work was well done, and would be so far set free for the introduction of work not usually included. Its function should be to supplement all those points which the clinical work cannot embrace.

(A.) *Two Courses of Surgical Lectures.*

The course of surgical lectures to extend over two Winter Sessions, the subject treated in one session being omitted in the succeeding one. By this means useless repetition will be avoided, the whole range of surgical teaching will be exhausted more completely than can be done at present, and room will be allowed for the introduction of Operative Surgery, and practical training, and examination in surgical manipulation as a part of the Winter Course. These two subjects can by this arrangement be made compulsory on all students without increasing either the number of courses or of formal lectures.

(B.) *Operative Surgery.*

Operative Surgery to be part of every winter course. The winter subjects keep better, are more accessible, and dissecting-room work generally is in its greatest vigour.

(C.) *Mode of Teaching Operative Surgery.*

The senior students (*i.e.* those attending the second course of surgical lectures) to perform the operations on the dead body in the presence of the class, of the lecturer, and perhaps of other of the hospital surgeons. The operations to be assigned to each student by lot, the series of operations being known some days beforehand, that the students may have previously read up what they are liable to be called upon to perform. The student would be catechized and criticized by the lecturer as he performed the operation, and the class would learn much by his answers and failures.

(D.) *Operative Surgery every Winter.*

By repeating this part of the course every winter each student as he became a senior would have an opportunity of performing before the class.

The surgical practice of the hospital ought to be open to every student during the whole of his four years, his attendance being optional in the first year, compulsory and regular the last three.

P.S.—Appended is a short note from my friend and colleague, Mr. Wheelhouse, to whom I submitted the above for perusal.

42, Park Square, Leeds,
September 25, 1868.

My dear Teale,

Accept my thanks for the opportunity you have given me of reading your answers to the questions transmitted to you by Mr. James Syme on the subject of surgical teaching.

In the general scope of your view I most cordially agree, and I believe that if Surgery is ever to be taught in a really scientific spirit it must be done, as you suggest, chiefly at the bedside, and as strictly clinical teaching.

Two years so spent, under the direct observation and guidance of a good and experienced teacher, would, I am convinced, prove of inestimable value to the student.

At the same time I think you seem in some degree to value the importance of the already accepted systematic course of surgical lectures less than I do.

To allow that, with a certain amount of *dilettanti* hospital work, to be the

sole groundwork af surgieal teaching, as was the usual eourse in my student time, is, I am eonvineed, a most profound mistake ; but there is still so mueh, so very mueh, in the way of prineiples of Surgery that eannot be taught as well in any other way, that I should lay more stress upon its neeessity than I think you do.

The general prineiples of the seienee should, in my opinion, be learned in the leeture room, and a good eourse of leetures on prineiples, extending over two years, would admit of the thorough and deliberate exhaustion of the subjeet.

The applieation of those prineiples and the practice of Surgery eould and ought at the same time to be enforced, as elinieal teaching, at the bedside.

And the operations and manipulations of Surgery should be learned by the personal performanee of both—the former on the dead, the latter on the living subjeet, under the eye of the teaeher, and of fellow-learners as you suggest, and as we earry out in our eourse.

I would further suggest that, where it is possible, every operation witnessed by the students as performed by the teaeher on the living subjeet should in his presenee be repeated by them on the dead.

I think that in your modesty you scarcely do us, who work in the Leeds eourse, justiee by saying that this is a plan "we look forward to aeeomplish hereafter." I feel that we do honestly endeavour to earry it out, as far as we possibly ean, even now ; and I always feel proud to think that, in our small way, we are in the vanguard of advanee.

Believe me, yours very truly,

C. G. WHEELHOUSE.

JOLLIFFE TUFNELL, Esq., *Dublin.*

In reply to your letter of the 7th of August requesting my opinion respeeting the eourse of study neeessary to enable students to obtain the requisite knowledge and skill for the effieient praetiee of Surgery, I beg to make the following suggestions, viz:—I would advise Anatomy to be required for four Winter Sessions ; the first and seeond sessions to be devoted to systematie Anatomy, with dissection ; the third and fourth to regional Anatomy (or that whieh is especially eonnected with operative Surgery) ; these, of course, also to be aeeompanied by dissection.

With referenee to hospital attendance and elinical hospital instruction, that it should take place during the seeond, third, and fourth years, both Winter and Summer Sessions, and not during the first year ; the time whieh would be so oeeupied during the first year being devoted to dissection.

That a *bonâ fide* certificate of dressership for a period of not less than three months, and upon not fewer than four beds, should be required from every student prior to examination for his licence.

That the examination for the surgical diploma should be conducted as practically as possible—that is, by the candidates being required to operate upon the dead body, to bandage and apply splints, &c. &c., upon lay figures, to explain the uses and construction of the instruments in common use, and to diagnose and describe the nature of surgical injuries and diseases, as illustrated by casts or drawings of cases laid before them.

The teaching of Surgery to be conducted, as at present, by lectures of systematic character in schools, and by clinical lectures in the theatres of hospitals upon the cases then under treatment; especially, however, by ward teaching at the bed-side of the individual.

Dr. HERON WATSON, *Edinburgh.*

1. "The topics which may most advantageously be included under the subject of Surgery and Clinical Surgery."

Inflammatory conditions, degenerations of tissues, tumours, concretions, and injuries affecting reputedly external parts, or at least such of them as by use and wont are included in the domain of the Surgery of the present day; together with the operations, manual appliances, and medicinal and dietetic agencies which experience points to as calculated to cure or relieve these conditions.

The subjects actually taught will probably vary in every case, according to the predilections of the teacher, the time afforded for the course, or the plan of instruction pursued in the individual school.

The ordinary division of the subject of Surgery is into the systematic and clinical, the former being divided into the principles and the practice. The principles of Surgery are usually regarded as synonymous with the theory of Surgery or the science of Surgery; the practice with the art of Surgery, or the regional Surgery of the body; the principles including the general pathology of surgical disease wherever situated; the practice the special pathology of diseased conditions affecting certain parts or organs; the principles including a disquisition on the theories in connection with the causation of disease and injuries, the natural progress and history, symptomatology, and issue of the disease or injury when interfered with, and the procedures recommended and reputed satisfactory in combating the progress and result; the practice consisting of the characters by which disease or injury affecting

certain parts may be recognized, and the methods of treatment, operative or otherwise, found best calculated to afford a safe, speedy, and effectual cure.

Clinical Surgery should occupy a much more limited sphere, including nothing but the exposition of surgical principles and practice in so far as they directly bear upon the history, symptoms, diagnosis, prognosis, and treatment of cases actually under observation.

2. "The period in a four years' course when they can be most profitably studied, and the length of time which should be devoted to them."

The earlier a student can be introduced to the study of disease the better. He must, however, have acquired some degree of acquaintance with the healthy structure of functions of the human body before he can understand satisfactorily the effects produced by disease. Were this knowledge not acquired in the first instance the already too much curtailed course of Surgery would require to be still further infringed upon by the introduction of an anatomical and physiologieal proem, as a preliminary to the description of any form of disease generally or particularly considered.

The second winter seems accordingly as early a period in a four years' course of study as Surgery can advantageously be attended, which, however, implies that Physiology should be taught along with Anatomy and Chemistry in the first year of study.

A second course of systematic Surgery should also be imperative in the fourth or last year of study, as affording to an advanced student a corrective to the limited views he may have acquired from clinical teachers who are not abreast of the progress of the day.

Clinical Surgery, as taught by the bed-side—in other words, by following the instruction of a surgeon or surgeons as day by day he visits and examines each patient under his care—cannot be too soon commenced or too long continued. Such instruction, as a means of educating the observing faculties and accustoming students to the external aspects of disease, needs no recondite information to make it useful and valuable, and should therefore form a part of a student's daily occupation from the first day he enters on the study of his profession.

3. "The manner in which they can best be taught—by lectures, practical instruction, or otherwise."

The principles and practice of Surgery, so far as theory and Pathology are concerned, can only be taught in courses of lectures delivered by a teacher *au courant* of the progress of the day, aided by text-books, an extensive museum containing specimens of disease and injury, diagrams, casts, and models. The application of dressings, splints, and surgical appliances can best be taught in connection with Clinical Surgery.

Mechanical or manual dexterity in the application of dressings and operating

generally, may, to a limited extent, be attained by practice upon a lay figure or the cadaver.

Operative Surgery must in part be taught by oral instruction, in part by demonstration, and in part by frequent practice upon the dead subject. Experience, however, in operating upon the living patient will alone afford that combination of circumstances, suiting means to an end, which will enable any man to become what is called a good operator.

In lecturing upon systematic Surgery a teacher should give out to his class a certain number of pages of the text-book for home study, in anticipation of the next day's lecture. On the ensuing day the teacher should go over the subject in his lecture in the same order as that adopted in the text-book, pointing out wherein he differs from the author, and enlarging upon those points which he considers require explanation, correction, or amplification.

Clinical Surgery can best be taught by regular daily visiting in the wards, each patient in turn being subjected to examination by the surgeon before the pupils, so far as it may be right or necessary.

The patients, however, when first applying for admission, should be examined by the surgeon before the students, and in making this examination forming a diagnosis and prognosis; or in employing treatment the surgeon should make such remarks as may enable the students, in addition to what they can observe for themselves, to follow the train of thought in the mind of their teacher, which leads to a certain line of examination being pursued, a certain conclusion reached, and a definite mode of treatment adopted.

A class-room or theatre so constructed that the students can all both see and hear is essential for this mode of instruction being efficiently conducted.

Every surgeon to an hospital, both old and young, should have to occupy himself in this way day by day, so that the material in hospital may be efficiently utilized.

The hospital pupils should furthermore be told off in certain numbers to each surgeon, and a rotation of students among the teachers of Clinical Surgery should be insisted upon.

The surgeon should be made responsible for the regular attendance of the students constituting his *team* for the time being.

Those students who have attended clinical instruction for a period of six months should have the office of dressers and clinical assistants assigned to them, so that they may have a closer acquaintance afforded them with the aspects of disease and injury, and of the progress of cases under treatment and after operations. They should be transferred from one surgeon to another; so as to have an opportunity of comparing the teaching capacity, diagnostic skill, and success in practice of each of their teachers, and may thus acquire a knowledge of those qualities in each which by imitation are most likely to prove serviceable to themselves in after life.

As dressers and clinical assistants these advanced students will attain,

under the supervision of the surgeons, an intimate acquaintance with the application and removal of dressings in connection with a suffering patient which they could never gain by oral instruction or mere practice upon the lay figure or dead body.

Such personal contact with the great body of the students, as individuals acting under his supervision, will also afford the surgeon means for becoming acquainted with the qualities of each student, and of exerting a beneficial influence in promoting the development of those traits of character which are to be cherished, and of repressing those tendencies which are reprehensible.

MIDWIFERY AND DISEASES OF WOMEN AND CHILDREN.

NAMES OF GENTLEMEN WHOSE REPLIES FOLLOW.

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REPLIES.

Dr. CHURCHILL, *Dublin.*

I have to apologize for not having answered your printed circular sooner, but I was prevented by professional avocations. To answer your questions in order—

1. I find it difficult to say what can (not what should) be included in a course of Midwifery and Diseases of Women and Children. I used to give Midwifery fully, and fill up the remainder of the time with a pretty full description of the chief diseases of women, and as many of the diseases of children as I could find time for. Yet I lectured four times a week for an hour. In fact, each subject would take a course. I still think the plan I adopted the best, as it secures a good course of Midwifery.

2. I should say, in the pupil's last session, and a six months' course of lectures, and as long attendance in a lying-in hospital.

3. You must combine practical instruction in a lying-in hospital with lectures.

Dr. A. H. McCLINTOCK, *Dublin.*

In reply to the queries contained in your circular of 7th August last, I beg to submit the following observations for the consideration of the Committee, of which you are Chairman :—

Query I.—The topics which I think should be included under the subject of "Midwifery and Diseases of Women and Children," are as follows :—

The anatomy, physiology, and pathology of the female generative organs, in the gravid and non-gravid states; ovology; the signs and symptoms of pregnancy; the phenomena and management of normal and abnormal parturition; the symptoms and treatment of diseases peculiar to women, including those of pregnancy and child-bed; the symptoms and treatment of diseases of infancy and childhood.

Queries II. & III.—In answering these, I am much influenced by the consideration that the opportunities of acquiring practical information in this department of medicine are, and always will be, to the mass of students, exceedingly limited. This arises partly from the small number of clinical illustrations to be met with in hospitals, and partly also from the nature of the cases themselves, which must render their investigation by a class, very superficial and restricted. Hence it seems desirable that the obstetric student should be able to *profit to the fullest extent* by such clinical opportunities as are presented to him. I would, therefore, defer the study of Midwifery, &c. to near the end of his pupilage, when his powers of medical observation will be greater and more natural. For the same reason I would have him attend the systematic school-course of lectures (at least eighty in number), on Midwifery, &c. &c. *before* entering upon its clinical study. He should attend a maternity clinique for six months or upwards, and assist at not less than thirty labours. The Obstetric Physician (or Surgeon) to the clinique should regularly deliver *clinical lectures* to his class, so as to turn to the best account the cases coming under observation. Both these lectures and the systematic course should be illustrated, so far as they possibly can be, by every auxiliary in the way of preparations, casts, plates, drawings, models, diagrams, &c. &c.

Dr. MATTHEWS DUNCAN, *Edinburgh.*

I can answer your letter of the 7th ultimo at once, because the subject has been long under my consideration, and my opinions are nearly fixed.

1. The topics which may most advantageously be included under the subject of "Midwifery and the Diseases of Women and Children," are—

(*a.*) The obstetrical anatomy and physiology of the pelvis, and of the female generative organs.
(*b.*) The anatomy of pregnancy.
(*c.*) The signs and symptoms, and diseases of pregnancy.
(*d.*) Natural labour.
(*e.*) Unnatural labour.
(*f.*) The puerperal state and its diseases.
(*g.*) Suckling and the nursing of healthy-born children.
(*h.*) The diseases of newly-born children; that is, those that specially affect children less than a month old.
(*i.*) Diseases peculiar to women.

2. These subjects can be most profitably studied in the third or fourth year of the curriculum. The course should include about eighty lectures of an hour each.

3. Besides the course of systematic lectures, every student should have clinical instruction in all the topics. He also should be required personally to attend ten cases of labour under proper superintendence.

Dr. R. DYCE, *Aberdeen.*

1. The topics which should be included under the subject of Midwifery and Diseases of Women and Children are various, not merely Midwifery proper, but numerous collateral subjects, such as the anatomy of the pelvis, but only so far as is connected with parturition commencing with the bones, especially noticing its normal state as well as abnormal or deformed states, this leading to distortions generally. The fœtal skull; the external and internal parts of generation, particularly the uterus and its appendages, its functions; menstruation; conception, signs and symptoms; theories of generation, ancient and modern; contents of the gravid uterus; diseases of the pregnant state, with their treatment; labour in all its variations, with its management; treatment of women after delivery; diseases of the puerperal state; diseases of women, especially of the uterus and its appendages, organic and functional; displacements, &c., in the unpregnant state; management of infants from birth; diseases of infancy and childhood. These latter, if extended, might form a course of themselves, but as many as exanthems and others, though occurring in infancy, are not strictly confined to that age, I would omit, and substitute what I consider of much more importance—the early management and physical education of infants as to food, air, and exercise, requisites of a nurse, methods of feeding infants, nursery management, teething-time, weaning-time, and similar subjects, which I find students are lamentably ignorant of. Infantile therapeutics are especially necessary, method of vaccination, &c. &c.

With regard to the numerous subjects I have considered necessary in Midwifery, I may mention that I have found it impossible to embrace all during the five months' Winter Course. I have hence omitted nearly all anatomy, in the belief that students are, or ought to be, sufficiently well up in this branch before they commence attendance upon Midwifery in an advanced class.

2. The period when these subjects can be most profitably studied is unquestionably either in the third, or better, fourth year of study.

3. The subjects are best taught, partly by lectures, by weekly class examinations and practical instruction by cases, during the progress of the course. Class examinations are of great importance, and I find that they are

equally valued by the students, as seldom or ever do they absent themselves from these meetings. I have even been requested to hold them oftener, but which the amount of remaining work I had laid out for myself prevented.

I shall be happy to afford any further information if required.

Dr. ARTHUR FARRE, *London*.

In my opinion, the means of instruction in Midwifery and Diseases of Women and Children should consist as follows :—

1*st*.—Of a special hospital, or a certain number of beds in a general hospital, wherein the more severe forms of the diseases just mentioned can be observed and treated, together with an out-patient department, for the exemplification of female and infantile diseases in general, upon a much larger scale.

2*nd*.—Of a lying-in department, connected with such hospital, for the delivery of women at their own homes by students, superintended by a resident medical officer, specially appointed for that purpose.

3*rd*.—Of an ample collection of diagrams, casts, models, anatomical preparations, especially clay ones that can be handled, such as of the pelvis in its natural and diseased conditions, and various obstetrical instruments.

With such means and appliances I advise the course of instruction to extend over two years, and to be conducted in the following manner, viz. :—

Two courses of lectures and demonstrations, each course consisting of not less than forty-five lectures, including the demonstrations.

These two courses to be so divided, that while the main points are treated of in each year, others of less consequence may be taken in alternate seasons.

The subjects which, in my opinion, should form the permanent portion of a course are partly physiological, but chiefly practical.

The physiological subjects should relate mainly to menstruation, conception, gestation, and parturition. It has hitherto, I believe, been the practice to leave much of this to the obstetric teachers; but I think that all these might be fully considered in the physiological course, so as to leave to the obstetric teacher only those points which have a special practical bearing. For this purpose, probably, five lectures would suffice in the obstetric course.

The main points in obstetric practice should constitute the principal portion of the course, while many subjects, such as the more rare operations and events incident to child-births, may be sufficiently considered in alternate seasons, and may be treated of towards the end of the course.

Interspersed among the lectures, I recommend examination of the whole class at stated periods—say once a fortnight—an examination to count as a lecture.

On account of the large number of subjects necessarily included in the obstetric course, it is not possible to consider efficiently the Diseases of Women and Children; and I believe that in many instances when this attempt, or the promise of it, has been made, it has broken down towards the end of the course. Hence I believe that, whenever the means are at hand, the Diseases of Women and Children are best taught by clinical lectures.

Almost all the ordinary chronic maladies in the female, and most of those in children, as well as many of the acute forms of the latter can be taught from cases attending the out-patient department; and whenever beds are set apart for such cases—which ought, in my opinion, to exist in every general hospital, the means of illustration are still further extended.

When the students have attended one course of lectures and examinations they should have cases assigned to them, for the attendance upon which they should be held strictly responsible, and no student should attend less than twenty cases. This is the portion of the course of instruction which is, practically, by far the most difficult to carry out, for many reasons, but chiefly, apparently, on account of the restraints which such obligations impose upon many students, who, not having, perhaps, any immediate prospect of practice in that department, feel little interest in acquiring the practical knowledge of it.

If in this letter I have omitted to reply to any points upon which I can offer to the Committee of Education my farther experience as a teacher in this department, I can only say that it will give me very great pleasure to supply the unintentional omissions.

Dr. GRAILY HEWITT, *London*.

Question 1.

The topics to be included in the subject of Midwifery and Diseases of Women and Children should be, in my opinion—

(*a*.) 1. Physiology } of { Pregnancy, Parturition, and Child-bed.
2. The Pathology }

(*b*.) The Diseases of the Female Generative Organs.

(*c*.) 1. The Management of Infants during the first year of life.
2. The Diseases of Infants in the first year of life.

Question 2.

The above subjects should be studied during the third and fourth years, but principally in the fourth year; *i.e.* during the third year lectures to be attended, and a few cases of labour conducted by the student.

During the fourth year, lectures also, but the chief attention to be devoted to practical study.

By practical study is to be understood:—

Attendance on about twenty or thirty cases of labour.

Attendance in the out-patient room for Diseases of Women, and in the ward of the hospital devoted to this department. [This clinical study of the Diseases of Women is best undertaken during the fourth Winter and Summer Sessions.]

My opinion is that these departments of medical study will not be adequately mastered (even in an elementary manner) by students until more time is devoted to them. At present the student infers that three months is sufficient, but experience has convinced me that the student must have his attention directed to these subjects for a longer period than three months if satisfactory results are to be looked for. I do not for a moment contemplate that the whole of the third and fourth years are to be consumed in the study of the subjects above alluded to, but they should form a part of the student's daily or weekly work during these two years.

Question 3.

Midwifery is best taught, in my opinion, by a good elementary course of systematic lectures, and by careful supervision of attendance on actual cases. The systematic instruction cannot be dispensed with, but the clinical supervision is equally important.

The Diseases of Women.—This subject should be carefully and systematically taught, partly by systematic lectures, but chiefly by practical demonstration in the ward or out-patients' room. To teach this subject is exceedingly difficult for reasons which are too obvious to require mention, but these difficulties will be best surmounted by the formation of clinical classes of limited numbers.

Dr. LEISHMAN, *Glasgow.*

I have had some hesitation, seeing that my experience as a lecturer on Midwifery and Diseases of Women and Children has been so limited, in replying to your circular of the 7th of August. Having, however, had considerable experience in teaching the subject practically, I think I may

venture (*valeat quantum*) to give you my opinion on the three points in respect to which the Committee desire information.

1. If the course is a six months' one (100 lectures), the whole theory and practice of Midwifery, as well as the elements of Diseases of Women and Children may be embraced. If, on the other hand, it is a three months course (50 lectures), I am of opinion that the subject of Midwifery proper can alone be attempted, probably touching but lightly upon such subject as the early development of the ovum.

2. Certainly in the fourth year. I am not in favour of multiplying lectures, and am somewhat in doubt as to whether a six or three months course is best in the interest of the student.

3. By lectures, combined with practical instruction. The practical instruction of a lying-in hospital is obviously by far the best for the student. Having, however, formed a very strong opinion as to the impropriety of maintaining such institutions in view of the enormous maternal mortality which they engender, I am altogether in favour of out-door Midwifery charities, where students and midwives may be trained under the supervision of an efficient staff of clerks and assistants.

Drs. HENRY OLDHAM, J. HALL DAVIS, W. TYLER SMITH, ROBERT BARNES, J. BRAXTON HICKS, W. O. PRIESTLEY, GRAILY HEWITT, JOHN CLARKE, E. HEAD, F. PARSON, FREDERIC BIRD, and ROBERT GREENHALGH, *Lecturers on Midwifery, &c., London.*

The Lecturers on Midwifery and the Diseases of Women and Children attached to the London schools considered that they might most effectually promote the object sought by your Committee by discussing the matter together, and submitting the conclusions which they, as a body, might arrive at.

They have accordingly met in deliberation, and beg leave to submit the following:—

The Lecturers—considering the great extension which has been made in recent years in the knowledge of Obstetrics and the Diseases of Women and Children; the deep interest of the public in possessing practitioners duly skilled in this department; and that it is of paramount importance to the comfort and success of the young practitioner to possess sound theoretical and clinical training in it—are unanimously of opinion that the actual means of study, and the share devoted to it in the present curriculum, are insufficient.

At present one Summer Course of three months only is required. It is found to be impossible in such a course to treat adequately of the subject of Midwifery proper; whilst the extensive and important subjects of the Diseases of Women and Children must be left untouched.

As to "the topics which may most advantageously be included under the subject of Midwifery and the Diseases of Women and Children,"

The Lecturers are of opinion that the course of instruction should embrace:—

1. All that relates to pregnancy, parturition, and lactation;
2. All that relates to the functions and diseases of the sexual system of women; and
3. The diseases of childhood.

As to "the period in a four years' course when Midwifery can be most profitably studied, and the length of time which should be devoted to Midwifery,"

The Lecturers are of opinion that the study of the subject of Midwifery and the Diseases of Women and Children should be extended over two courses of lectures; and that these may be most profitably attended during the second and third Summer Sessions; and, further, that a course of clinical lectures—not less than twenty in number—on the Diseases of Women and Children, should be attended during the third or fourth winter.

As to "the manner in which Midwifery can best be taught—by lectures, practical instruction, or otherwise,"

The Lecturers are of opinion that attendance upon systematic lectures on Midwifery is indispensable. They believe that Midwifery, even more than Medicine or Surgery, admits of illustration by preparations, fresh specimens, and drawings; and that an important portion of the subject requires and admits of demonstrations by the lecturer and manual practice by the students.

With a view to the better clinical teaching, the Lecturers are of opinion that there should be attached to every hospital an obstetric physician and an assistant obstetric physician or two obstetric physicians, it being impossible for one officer to be at all times ready to meet the sudden emergencies of Midwifery.

Also, that the students should be required to attend Midwifery cases—not less than twenty in number—after or during their attendance upon the first course of lectures on Midwifery; and that to assist the students, as well as to conduct the maternity department in an efficient manner, a resident accoucheur, or obstetric assistant, acting under the guidance of the obstetric physicians, be attached to the hospital.

As to "instruction in the Diseases of Women,"

The Lecturers are of opinion that a ward should be devoted to the Diseases of Women; and that the out-patients' department for women should be made

more available for clinical instruction by attaching clinical clerks and dressers, as is done in the medical and surgical departments.

Also, that every student should be required to follow during at least six months the practice in the obstetric department, including the ward for Diseases of Women and the out-patients.

In relation to this point, the Lecturers are of opinion that a similar rule to that of the College of Surgeons (Section II., No. 10), which requires a certificate of having attended clinical lectures on Surgery; and to that of the University of London, which requires a certificate "of having attended the surgical and the medical practice of a recognized hospital during two years, with clinical instruction and lectures on Clinical Surgery and Clinical Medicine," should be extended to the obstetric department.

They remark that, in the case of the most modern curriculum, that of the Royal College of Physicians for the licence, a certificate is required "of having been engaged during six months in the Clinical study of Diseases peculiar to Women."

As to "the Diseases of Children,"

The Lecturers are of opinion that a special ward should be devoted to sick children, that sick children should be seen in the out-patients' department, and that attendance in this branch should be held to be an essential part of the Clinical Study in the department of Midwifery and the Diseases of Women and Children.

Dr. J. G. WILSON, *Glasgow*.

In my opinion the following topics may most advantageously be included under the subject of Midwifery, viz. :—

(*a*.) The anatomy of the female pelvis and organs of generation.

(*b*.) The anatomy of the fœtal head.

(*c*.) The physiology of the female organs of generation.

1. Ovulation.
2. Menstruation.
3. Generation.
4. Conception.
5. Development of the ovum (Embryology).
6. Utero-Gestation.
7. Parturition.
8. The puerperal state.
9. Lactation.
10. Management of early infancy.
11. Puerperal diseases.

(*d.*) Under the subjcet of Diseases of Women should be ineluded only those diseases or malformations whieh originate in, or are peeuliar to, the sexual system of the female.

(*e.*) Under the subject of Diseases of Children (infants?) I would inelude only those diseases peeuliar to ehildren during the first year of life (also ineluding congenital malformations).

The students in this university generally attend the Midwifery elass during the sceond summer, or after seeond winter. They are strongly recommended to attend Practical Midwifery in the maternity hospital after they have attended the Midwifery elass.

In my opinion the manner in whieh the subject can be best taught is by lectures and demonstrations in the elass room, and clinical or praetieal instruetion in a maternity hospital.

FORENSIC MEDICINE.

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REPLIES.

Dr. T. G. GEOGHEGAN, *Dublin.*

With reference to the points on which you have done me the honour to request my opinion, I beg to observe that, as regards—

Query 1.—"The topics which may most advantageously be included under the subject of Forensic Medicine" the following are those which, according to my experience, may be most profitably presented to the student :—

1. A practical sketch of the physical and other conditions ordinarily observable in the dead body, both antecedently and subsequently to the occurrence of decomposition, with an account of the modifications to which they are subject.

2. A statement of the most frequent causes of sudden natural death, as discoverable on dissection in the various regions of the body, with a medico-legal commentary on the practical forensic questions arising out of each. The relations of latent diseases and of pseudo-morbid appearances to such cases, with an exposition of the causes and general characters of the latter (appendix) on the proper and systematic conduct of medico-legal autopsies.

3. A concise and practical history of the following modes of violent death, medico-legally considered :—

(*a.*) By wounding.

(*b.*) By apnœa and its modifications, including the topics of drowning, strangulation (proper and with suspension), smothering, the action of noxious gases.

(*c.*) By burning and by cold.

(*d.*) By lightning and by starvation.

(*e.*) By the action of poisons, comprehending an account of their physiological mode of action, followed by a medico-legal history of each of the more important poisons in their physiological, pathological, and forensico-chemical bearings.

4. A concise discussion of the topics of rape, the signs of delivery, criminal abortion, and infanticide.

5. The relations of insanity to medical evidence in civil and in criminal cases, and to the duties of the medical practitioner.

6. Life assurance, in its forensic bearings.

7. Medical evidence, practically considered.

Query 2.—Legal Medicine may be most profitably studied in the last year of the proposed period, and for obvious reasons. Not less than forty lectures should be devoted to the subject.

Query 3.—Forensic Medicine may, in my opinion, be most advantageously taught by a combination of lectures and of practical instruction. In a properly conducted course of lectures, practical instruction is necessarily to a notable degree included; still, I hold it to be highly desirable that facilities should be afforded by the public authorities in all the great centres of medical instruction, with a view of enabling students to witness the performance of autopsies in the various medico-legal cases of daily occurrence. Such investigations, if conducted by experienced persons, well versed in Legal Medicine, Pathology, and Morbid and Healthy Anatomy, could not fail to prove of the utmost value as a means of disseminating sound and reliable medico-legal knowledge.

It appears to me, also, that students should be enabled and required to attend a short course of lectures on mental disorders, with illustrations from the subject, at a public lunatic asylum of repute.

Dr. W. A. GUY, F.R.S., *London.*

1. (*a.*) Medical evidence, treated from a medical point of view, as an aid and guide to the witness.
 (*b.*) Identification under the heads of sex, age, and personality.
 (*c.*) Questions relating to the procreation of children, under the heads of impotence, rape, pregnancy, and delivery.
 (*d.*) Questions relating to the birth of children, under the heads of fœticide, infanticide, and legitimacy.
 (*e.*) Unsoundness of mind.
 (*f.*) Death by violence in every form.
 (*g.*) Death by exposure to destructive agents, &c., such as fire, lightning, cold and starvation.
 (*h.*) Toxicology, treated generally, and in detail.
 *** Life Assurance and feigned diseases, though interesting to many medical men holding public appointments, might be left to the option of the teacher.

2. It should be the last course of the ten courses specified by the Committee. It should, I think, be given in the fourth Winter Session, or in the third at the earliest. It should be a six months' course, and comprise at least seventy lectures and examinations.

3. Partly by lectures and partly by practical instruction. The practical

instruction should be given by a chemist, having all the resources of a laboratory at command. It may be worthy of consideration whether in the summer following the lectures on Forensic Medicine, the pupil should not be required to attend a course of practical Toxicology.

I append, as requested, the following observations and suggestions on the medical curriculum; beginning with a rough tabular scheme.

INTRODUCTORY SESSION.

Summer Session, being the beginning of the medical curriculum.	*a.* Botany. *b.* Zoology. *c.* Physics. *d.* Osteology, &c., (?) Ligaments.
1*st Winter Session.*	*a.* Anatomy. *b.* General Anatomy.* *c.* Chemistry. *d.* Dissections. Out-patient hospital attendance.
1*st Summer Session.*	*a.* Materia Medica. *b.* Practical Chemistry. *c.* Practical Pharmacy. Out-patient hospital attendance.
2*nd Winter Session.*	*a.* Physiology.† *b.* Surgery. *c.* Dissections. In-patient hospital practice.
2*nd Summer Session.*	*a.* Midwifery. In-patient hospital practice.
3*rd Winter Session.*	*a.* Medicine. *b.* Forensic Medicine. In-patient hospital practice.
3*rd Summer Session.*	*a.* Morbid Anatomy. *b.* Practical Toxicology. In-patient hospital practice and cases in Midwifery.

NOTES.—The above scheme assumes—

1. The commencement of the medical education in May, not in October.
2. Not more than one course of lectures on one and the same subject.

* Or, second Winter Session.

† Or, third Winter Session.

3. Education complete in a preliminary Summer Session and three Summer and Winter Sessions.
4. Time for the introduction of one or more other courses—*e. g.* Hygiene in second Summer Session.
5. Arrangements at all hospitals by which surgeons and physicians shall attend at different hours or days, so as not to clash.
6. Clinical lectures assumed as part of hospital practice.

Dr. JOHN HARLEY, *London.*

1. Topics.

All those treated of in manuals of Forensic Medicine, such as Guy's and Taylor's, and in addition—

(*a.*) The rules and formulæ relating to the registration of births and deaths.

(*b.*) The rules, formulæ, and duties of a medical man in relation to the Poor Law Board.

(*c.*) The duties of a medical man as an officer of health.

(*d.*) The duties of a medical men in reference to a coroner.

(*e.*) The forensic duties of a coroner.

2. When to be Studied.

During the fourth year, and for a period of not less than six months.

3. Manner of Teaching and Learning.

1. With regard to the teacher. A systematic course of oral lectures is superfluous, inasmuch as each student possesses the information in a written form in the manual which is placed in his hands. The duties of the professor should be confined—(*a.*) To demonstrations upon the dead body (*e.g.* the effects of wounds, bruises, and burns), and from morbid specimens, *e.g.* showing the effects of corrosive poisons; and (*b.*) To directing and improving the student in a laboratory of Forensic Medicine.

2. With regard to the student. He should go through a regular course of practical instruction for the detection of poisons, and their separation from complex, or organic mixtures.

It may be said that this is already provided for, and in many cases carried out, in the course of Practical Chemistry. As far as my experience extends,

little or no knowledge of the detcetion of poisons—excepting arscnic and antimony—is obtained in the usual coursc of Practical Chemistry.

Bowman's "Practical Chemistry," is the text-book chiefly used in tcaching, and with that dcvotion to systematic tcaching which is the bane of the student, the teacher begins at the beginning, and insists much on glass-blowing, alkalimestry, and other things great in the eyes of a *chemist*, but of no use to a medical practitioner; and before the student comes to that which is really essential to him, the course is ended. The course consists of about twenty lessons, and excepting six months at most, the rest have little or nothing to do with Forensic Medicine.

In my opinion, no Chemistry should be taught a medical student that is not either pharmaceutical Chemistry or the Chemistry of the poisons.

The student should receive his certificate of proficiency on furnishing evidence of having—

1. Passed three written examinations.
2. Attended the demonstrations and coursc of practical instruction regularly.

And on presenting—

3. A well dissected fœtal heart, properly mounted in preservative fluid.
4. A microscopical collection of the crystals, and deposits of the arsenical antimonial, mercurial, and other preparations.
5. A collection of the British poisonous plants, dried, mounted, and named.
6. A collection of poisonous seeds and roots, &c.
7. Two well attested observations on the rate of cooling of the body.

The student should thus be encouraged to avail himself of the advantages of the *post-mortem* theatre, of the botanical gardens, and of the practical course of instruction provided for him, and be at the same time enabled to equip himself with materials of his own constructing, to which, when engaged in practice, he may readily and confidently turn for guidance.

Dr. H. LETHEBY, *London.*

I regret exceedingly that I have not been able to find time to draw up a report for you on the subjects of your letters to me in July and October, as to the best methods of teaching Forensic Medicine to students. On several occasions I have endeavoured to get an opportunity for this purpose, but have always failed on account of great pressure of professional work, and now I can only refer but briefly to the matter.

In the first place, it has always appeared to me that the subject of Medical Jurisprudence has rarely received that attention in our medical schools which

it deserves; for, as it is not a subject of examination with the college, it is thought but little of by either lecturer or student; and too frequently it is taken in hand, not on its own account, but merely as a step towards some other appointment. In the next place, the three great divisions of the subject—Toxicology, Hygiene, and Forensic Medicine proper, are not generally kept sufficiently apart, and taught as special subjects by special teachers; for as each of these subjects comprehends a good deal of special knowledge, it can hardly be expected that they can be all well taught by one teacher.

I would like, therefore, to see each of these subjects taught separately by separate lecturers, and in the case of Toxicology, there should be practical instruction in the laboratory.

I do not think that a long course of lectures on each of these subjects is necessary, but such a course in each case as would enable the medical student to apply the special knowledge acquired in each department of study to the general purpose of medical police.

The subject is best taught in the summer term, when opportunities might be afforded to the pupils, by the teacher, of seeing, in the case of Hygiene, the effects of unwholesome occupations, and the best appliances for regulating offensive trades, and obviating the nuisances arising from them.

In short, as in other departments of practical Medicine, the method of teaching should be as practical as possible, and this might be eminently so in the case of Toxicology and Hygiene.

I trust you will accept my apology for the delay in acknowledging your letter.

Dr. HENRY D. LITTLEJOHN, *Edinburgh.*

1. Generally speaking all subjects regarding which medical men may be called upon to give evidence in courts of law.

This definition includes, of course, Hygiene as applicable to individuals and communities, in addition to the ordinary topics treated in courses of Forensic Medicine, such as—

The various forms of violent death;
Death by wounding in all its forms;
Death by asphyxia in all its forms;
Death by poisoning;
Offences against decency and the reproduction of the species;
Infanticide; and, lastly,
Disqualifications arising from
(*a.*) Bodily,
(*b.*) Mental causes (insanity).

2. Undoubtedly during the fourth or last year of study; inasmuch as the

illustrations of the subject are derived from all the courses the student has previously attended or is attending at the time.

Having regard to the arrangement of the curriculum and the other important subjects which claim the student's attention it is impossible to allow more than three months to Forensic Medicine, and in my experience, extending over twelve years, I have found this period amply sufficient for the discussion of the topics just enumerated. With the exception of Hygiene, the consideration of which I have generally been compelled either to omit entirely or to reserve for an hour in the evening, much depending on the interest manifested by the class in the subject. Every year's experience, however, teaches me that the ordinary lectures admit of greater condensation, and I am convinced that ten lectures out of a course of sixty might be devoted to Hygiene.

3. On this point I hold very decided opinions. I have long felt that Forensic Medicine was not properly taught in this country. It is a course generally handed over to the youngest and least experienced teacher in a medical school, who, in his lectures, has only some text-book to fall back upon and cannot appeal to his own experience. The student, on the other hand, has no opportunity of testing the statements of the lecture-room by a reference to facts, he is never called upon to draw up medico-legal reports, and he is never asked by his teacher to watch criminal procedure in a court of justice. Under these circumstances the course of lectures is uninteresting, and is looked upon by the student as a bore, and he enters upon practice quite unfit to discharge the duties of a medical inspector. Hence, in my opinion, the prevailing distrust of medical evidence, and the unsatisfactory result of many criminal trials.

The first case a young practitioner may be called to in his practice may be one in which an acquaintance with the practice as well as the principles of Forensic Medicine may be of essential importance, and yet from the imperfect manner in which he has been taught, he finds himself unable to furnish the authorities with satisfactory information, and it must not be forgotten that an error committed by a medical practitioner, in consequence of his ignorance of the forms and practice of Forensic Medicine does not pass unnoticed (like many mistakes in diagnosis, &c. &c., in ordinary practice), it reappears to annoy him in a court of law, and may injure his reputation and prospects.

Forensic Medicine, as at present taught, wants that practical department which is now found to be essential to the teaching of Anatomy, Chemistry, Materia Medica, Surgery, Medicine, and Midwifery. These have dissecting-rooms, laboratories, hospitals, and dispensaries, Forensic Medicine alone being unprovided with a similar adjunct.

I have attempted to supply the deficiency, and with such a measure of success, as to justify me in pressing my views on the attention of the General Council of Medical Education.

Twelve years ago I determined to conjoin the lectureship on Forensic Medicine at the Medical School, Surgeon's Hall, with the office of surgeon to the police establishment of Edinburgh. The surgeon of police is summoned to all cases of inquiry, and of sudden and violent death which come under the notice of the authorities, and he has, therefore, in such a city as Edinburgh, and in its neighbourhood, a wide field of instruction. This I make available to my class in the following manner :—

The students are summoned in rotation, and in parties of three or four, to accompany me in these official visits. Under my direction two draw up such reports as the nature of case and the requirements of the law demand. These reports are read before the whole class and criticised and commented on by myself. They are then copied by the class. Not a session passes without several cases of drowning, violent death, infanticide, &c., being brought under the notice of the class, in addition to numerous varieties of assaults. Those of the cases which come to trial are watched during their progress, the various probable lines of defence criticised, and on the day of trial the class adjourns to the court of law, and has an opportunity of observing criminal procedure, of hearing medical reports read, and medical witnesses subjected to cross-examination. In such cases as violent deaths, drowning, infanticide, &c. &c., where the bodies are brought to the public dead-house, the whole class is brought together, and, after listening to a lecture on the special case, examines it carefully in turn. An hour thus spent is fully more than equivalent to several lectures in the class-room, and when the subjects thus practically treated are reached in the ordinary course of exposition they can be disposed of in a more summary manner than if the student had never had an opportunity of observing cases for himself. Nothing has impressed me more as a member of the Examining Board of the Royal College of Surgeons of Edinburgh, and also of the University of St. Andrew's than the difference in the answers of the student who has assisted at the investigation of a medico-legal case—say one of death by drowning—as compared with those of the student who has merely a book-knowledge of the subject.

A course conducted in the manner I have described, interests the student, and he attends it as eagerly as one of Clinical Medicine or Surgery. From many practitioners I have learned the benefits conferred by this method of instruction.

As mentioned in Query No. 1., Toxicology forms a part of the course of Forensic Medicine in the extra-academical school of Edinburgh, and while all the important poisons receive due mention and the appropriate tests are exhibited, special attention is paid to the differential diagnosis of poisoning, *i.e.*, the diagnosis of poisoning from disease. In some schools Toxicology is treated as a separate course, and is left to be taught by a chemist. This, in my opinion, is highly objectionable. No one but a medical man who has received a thorough hospital education, and has studied disease carefully for himself can

lecture properly on the symptoms of the various poisons and their differential diagnosis—which, in truth, is the important subject for the practitioner to be acquainted with. He may at any time be called upon to make the diagnosis, and several lives (not to speak of his own reputation) may depend on his ability to make it correctly and promptly, whereas, no practitioner is expected now-a-days to conduct a chemical analysis, although of course every intelligent medical man ought to be acquainted with the *rationale* of the tests and of the steps of the analysis. I see no reason, therefore, for dissociating Toxicology from the ordinary course of Forensic Medicine, and I feel the importance of having Toxicology treated by one who has received a medical education.

In conclusion, I beg to express my opinion that lectures alone (prepared from some well known text-book and containing no record of the lecturer's experience) are of little worth. They fail to interest the student, and to supply him with the kind of knowledge which as a practitioner he requires. Forensic Medicine, I hold, must be practically taught in some such manner as I have indicated, and all gentlemen in the metropolis and other seats of medical schools holding similar appointments, should be stimulated to become lecturers on a subject with the practical details of which they are daily occupied.

Of course diagrams and preparations are of great importance, and among the advantages of the junction of the offices which I advocate may be mentioned the facility with which an excellent working or teaching museum may be formed, and also the power this practical method of teaching gives the lecturer of condensing large portions of his course and thereby affording time for the exposition of the important subject of Hygiene.

Dr. DOUGLAS MACLAGAN, *Edinburgh*.

Question 1.

I might, in reply to this question, refer to the syllabus of my lectures in the *Edinburgh University Calendar*, but it must be remembered that I am a professor in the faculty of Law as well as in that of Medicine, and, as my class consists both of students of medicine and students of law, many subjects are introduced with which medical men, as such, have nothing to do, and are alluded to only to bring methods of scientific research in their bearing on the detection of crime under the notice of the lawyers. I would prefer, as the designation of this course of instruction, the title of "State Medicine," and it ought to consist of two portions—Medical Jurisprudence and Medical Police. I purposely use the term "Medical Jurisprudence," in

preference to "Forensic Medicine," because a medical man properly versed in Medical Jurisprudence, has no more frequent, and can have no nobler duty. than, by a well-drawn report or well-reasoned opinion, to prevent questions both of supposed crime and supposed injury to civil rights from becoming "forensic" at all.

Medical Jurisprudence ought to include—1. Medical evidence generally, embracing the laws of evidence, so far as those who may act as medical witnesses require to know it, the mode of framing reports, making judicial *post-mortem* examinations, &c. 2. Medical evidence, specially in its bearing on questions affecting health or life, such as assaults and homicide, suicide, offences against chastity, malpraxis, &c.; on questions affecting property, such as nuisances; and questions affecting civil rights, such as live birth, survivorship, insanity in its legal relations; and life assurance.

The second division of the course, or Medical Police, need not attempt to include what, for the sake of illustrating the bearings of Hygiene, stands in my syllabus as the hygiene of individuals, the most important portions of which, such as diet and regimen, ought to be discussed by the teacher of Materia Medica. There is no time for the teacher of State Medicine, even under the arrangement to be noticed below, to do more than consider the more important parts of the hygiene of communities, embracing such subjects as water supply, heating, lighting and ventilation of buildings, drainage and sewerage, cemeteries, &c.

Question 2.

Not sooner than the end of the third summer. The duration of the course ought to be four months, three being, as I know from experience, too few, while six would be too many. I am aware of the difficulties of dividing the entire year of study into two sessions of four months each; but I am persuaded that this would form by far the best arrangement for medical teaching generally. If this is impracticable, then there ought to be instituted a separate three-months' course of Hygiene, including the hygiene of individuals as well as of communities; thus relieving the teacher of Medical Jurisprudence of medical police, and the teacher of Materia Medica of diet, regimen, clothing, &c.; the three subjects of Medical Jurisprudence, Materia Medica, and Hygiene, being taught in three three-months' courses instead of two four-months' courses.

Question 3.

Lectures here are essential, because Medical Jurisprudence consists in the application of practical medical knowledge, previously acquired, to the elucidation of questions which are, or may become, Forensic. It is not easy to give direct practical instruction in many of the more important departments, such as the examination of wounds criminally inflicted, and

judicial dissections, because it is highly inexpedient that matters which may come before a court of justice should be investigated or canvassed in presence of a number of persons who have no official connection with the case. A teacher may avail himself of the ordinary dissections in the *post-mortem* theatre of the hospital to point out appearances which may be mistaken for the results of violence, and of the bodies of still-born children, if he can get them, to illustrate infanticide; and he ought always to have a proper laboratory in which chemical and microscopical investigations may be conducted either by, or in presence of, his pupils.

Dr. OGDEN, *Aberdeen.*

1. Medico-legal questions arising in connection with—
 1. Age.
 2. Sex.
 3. Identity.
 4. Impotence and sterility.
 5. Rape.
 6. Pregnancy.
 7. Delivery.
 8. Birth.
 9. Infanticide.
 10. Insanity.
 11. Feigned and fictitious diseases.
 12. Death.
 13. Wounds.
 14. Hanging.
 15. Drowning.
 16. Strangulation.
 17. Smothering.
 18. Death from heat, cold, lightning, &c.
 19. Toxicology.

2. Fourth year.

3. Lectures, *vivâ voce* examinatory, exhibition of drawings, tabular views, casts and microscope, testing of poisons, blood stains, &c., laboratory work, and when opportunity presents, assisting at medico-legal inspections.

Dr. RAINY, *Glasgow*.

I have received your communication of 6th August, in reference to the teaching of Forensic Medicine, with the queries proposed by the Medical Council, which I propose to consider and answer in their order.

1. I think the topics which may most advantageously be included under the subject of Forensic Medicine are—all the medical questions which are calculated to elucidate judicial proceedings, and I think they may be referred to four heads.

1*st*. Questions relating to personal injuries, whether dependent on external violence or on poisoning,

2*nd*. Questions relating to the several functions leading to judicial investigation.

3*rd*. Questions relating to bodily soundness, including life assurance and grounds of exemptions from, or fitness for, civil and military duties.

4*th*. Questions relating to mental soundness.

By this post I send a copy of the syllabus of my lectures, containing a more extended view of the arrangement which I have adopted for several years in teaching Forensic Medicine, in case any member of the Medical Council might think fit to look into it.

2. I am decidedly of opinion that the last year of the curriculum is the best time for the study of Forensic Medicine. All the department of Medicine may furnish data to Forensic Medicine.

3. I am of opinion that Forensic Medicine can best be taught by lectures, combined with oral examinations, written exercises, and practical testing of the most important poisons, both in their ordinary state and when mixed up with the more common elementary matters. In my classes these examinations are not imperative, but the students take a great interest in them. I do not give special certificates of proficiency to any except those who submit to their examinations, and the number who submitted to these examinations during the last session was sixty-two, out of a class of sixty-eight. In the analysis of poisons the student is required to describe minutely the process which he has followed, and to give in the products of his investigation, so as to give the teacher the opportunity of pointing out any error or defect.

4. Taking the average proficiency of students in their fourth year of medical study, I have never been able to complete the course described above in fewer than ninety lectures, extending over four months and a half; and have found it impossible, even in such an extended course, to take up the subject of sanitary arrangements.

MEDICAL EDUCATION GENERALLY.

NAMES OF GENTLEMEN WHOSE REPLIES FOLLOW.

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REPLIES.

Dr. BALFOUR, *Edinburgh.*

I enclose a copy of a lecture delivered by me some years ago on the subject of natural history studies in reference to Medicine, which will explain to a certain extent my views.

I have now lectured for twenty-eight years, and I have had much experience in practical teaching and examining, and I think that I know something of the mode in which instruction should be conveyed. Moreover, I have learned much in regard to the feelings and sentiments of students from twenty years connection with them as Dean of the Medical Faculty.

I believe that we commit an error in not putting Botany and Natural History by themselves as preliminary subjects of examination. These studies should certainly be required for all well educated medical men, and more especially from those who aspire to university honour in Medicine. No M.B. or M.D. should be sent forth without having a groundwork of natural science. Without this a doctor cannot keep his place in society, and he is disqualified for many situations of importance both at home and abroad. Students should, however, pass the examination on natural sciences at an early part of their career, and before they have entered on Anatomy or Surgery. Their knowledge of this science should be of a practical nature, and should have been derived not merely from lectures, but from demonstrations on animals and plants, both in a living and dead state. A practical examination is well fitted for putting a stop to the system of cramming. Expositions in the museum, the garden, the fields, the mountains, and the sea-shore might well be substituted for a certain amount of lecture.

The question of Chemistry is a difficult one. A certain amount of elementary Chemistry is required for Vegetable Physiology; but this might probably be picked up during the botanical course.

At the present day students require a thorough knowledge of Inorganic and Organic Chemistry in order to understand Human Physiology, Materia Medica, the phenomena of disease and questions in Legal and State Medicine.

I am disposed to think that there should therefore be a distinct examination on Chemistry, consisting not merely of oral questions, but of teaching in the laboratory.

Chemistry, as well as Botany and Natural History, should be acquired before the commencement of strictly professional studies, such as Anatomy, Physiology, Surgery, and Medicine.

These sciences, in fact, constitute now-a-days part of a liberal education, and are not confined to a particular profession.

The student entering on a medical curriculum should have previously passed his preliminary examination in arts and in the above-mentioned sciences. He can thus devote his whole energies to the practical study of the structure and formation of the human body, and to the treatment of its diseases. The dissecting room and the hospital must be places of daily resort, and it is probable that practical demonstration might be substituted for a certain amount of systematic lecturing.

Class examinations, when properly conducted, are, I think, productive of much good, more especially in the preliminary scientific departments of the medical student's course.

Systematic teaching must be combined with demonstration, and practical work on the part of the students if we wish to send forth well qualified medical men.

Dr. ROBERT BENTLEY, *London.*

I have the honour to acknowledge the receipt of a note from you as Chairman of a Committee of the Medical Council, appointed to inquire how the various subjects of Medical Education which have been deemed requisite by the Council may be taught with most advantage, in what order they should be studied, and how the examinations on them ought to be arranged.

I believe that I shall best answer that communication by giving my opinions as concisely as possible upon medical education generally after an experience of more than twenty years as a teacher in four of the metropolitan schools of Medicine, and in the Pharmaceutical Society, during nearly six years of which I have been Dean of the Medical Department in King's College, London. I have come deliberately to the following conclusions :—

1. That the number of subjects now comprised in the curriculum of the the medical and surgical licensing boards should, under no circumstances, be reduced.

2. That the aggregate time of study for these and other subjects that might be introduced should be extended from three to four years.

3. That the time of studying the collateral sciences comprised in the medical curriculum should be separated, as far as possible, from that of the purely medical subjects.

In order to carry out my views I should strongly advocate the desirability of a student commencing his medical education on the 1st of May, instead of the 1st of October, as at present ; and then (the duration of the summer and winter sessions remaining as at present), my curriculum of study would be as follows :—

First Summer Session.

Botany.—One hour's lecture three times a week, and one hour's examination weekly.

Physics.—Lectures and examinations as with Botany.

Osteology.—One hour's demonstration twice a week, and one hour's examination weekly.

Practical Pharmacy.—Two hours daily.

First Winter Session.

Chemistry.—One hour's lecture five times a week, and one hour's examination weekly.

Practical Chemistry.—Two hours daily.

Practical Anatomy.—Three hours daily.

First Examination should take place in the following April, and comprise Botany, Physics, and Chemistry.

SECOND DIVISION OF CURRICULUM.

Second Summer Session.

Materia Medica.—Lectures of one hour four times a week, and two demonstrations and examinations from specimens, of one hour each.

Toxicological and Physiological Chemistry.—Two hours three times a week.

Practical Physiology and Microscope.—Two hours daily.

Second Winter Session.

Anatomy.—By lectures and examinations, one hour daily.

Physiology.—By lectures and examinations, one hour daily.

Practical Anatomy.—Three hours daily.

Second Examination in April, in Anatomy and Physiology.

THIRD DIVISION OF CURRICULUM.

Third Summer Session.

Principles of Medicine.—One hour's lectures three times a week, and one hour's examination weekly.

Principles of Surgery.—Same time as medicine.

Hospital Practice (Medical and Surgical).—Three hours daily.

Third Winter Session.

Medicine.—One hour's lectures four times a week, and one hour's examination weekly.

Surgery.—Same as Medicine.

Midwifery.—One hour's lectures three times a week, and one hour's examination.

Hospital Practice and Clinical Lectures.—Twice at least, two hours daily.

Fourth Summer Session.

Forensic Medicine.—One hour five times a week, by lectures and examinations.

Practical Midwifery.

Hospital Practice and Clinical Lectures.—Two, to three hours daily.

Morbid Anatomy.—By lectures and examinations, four times a week.

Hospital Practice and Clinical Lectures.

Vaccination.

Practical Midwifery.

Third and concluding Examination in April, in Medicine, Surgery, Midwifery, Materia Medica, and Forensic Medicine, or perhaps it would be better to examine on Materia Medica, and Forensic Medicine separately, at the end of the preceding Summer Session.

Such is my general scheme for Medical Education. I have purposely avoided all unnecessary details, in order that its broader features may not be lost sight of, and I now beg leave to transmit it to you in accordance with your expressed desire as Chairman of the Committee of Medical Education.

Dr. R. ELLIOT, *Carlisle.*

I have before me the printed report of your highly practical and pertinent address on Medical Education, delivered on 17th December, 1865, to the College of Surgeons.*

You rightly, in my opinion, say that our "professional education has become an effort of memory rather than a process of mental training." The fact is that the one great thing to teach, in school and at college, is really how to learn, rather than the imparting of detailed knowledge. The poet Cowper puts this neglected truth in a very practical shape, when he draws the all-important distinction between wisdom and knowledge, which is so generally ignored. One man, shrewd and wise, may, with less attainment, be superior in practically applying his clearly arranged and well assimilated, although not remarkably extensive, learning, in cases of emergency and unprecedented character, to another with a whole armoury or library in his overstocked head. We meet with positively learned fools sometimes.

I confess, however, that while I concur generally with your invaluable remarks on our examination, I do so with a qualification; at the top of page 12 you illustrate your objections to a practical examination, by a reference to the case of propping up a poor creature with lung disease, and hammering his chest for diagnostic sound, or committing a fractured limb to manipulation by unpractised fingers. But surely lung disease and fractured limbs should be more familiar, than the illustration implies, to the advanced student under examination for a licence that is immediately to entitle him to undertake treatment without any teacher at his side? And the aptness of the illustration can have no application to dissection on the dead subject, or to operating on the dead body, or the examination, chemical, pathological, and microscopical being carried out in the laboratory? I own to a strong predilection in favour of practical examinations over those exclusively *vivâ voce*, as unequivocally testing the manner and effect of the student's preparation of himself for his responsible duties as a medical practitioner. Even in the wards there need be really no cruelty whatever, if the cases be judiciously selected. Your estimate of class-examinations seems sound; but there would arise a great but probably not insuperable difficulty in securing reliable results.

It appears to me also, as you say, the distinction between Medicine and Surgery has been too long retained and is unsound. The education, the examination, and the practice in both are inseparable, and much harm has resulted to science and practice by this confusion.

Having thus, and I trust with due diffidence, expressed hearty concurrence in your proposal to substitute a chronic form of examination of pro-

* This answer is as addressed to Mr. Syme, the Chairman of the Committee.

fessional candidates, for the acute form now in use, I would beg to suggest, as worthy of discussion by your Committee, the appointment, in each examining district of a quondam lecturer or otherwise competent person—perhaps a long practised "grinder"—to be present at such examinations, which might come off once a month; he guaranteeing the maintenance of the accredited standard of examination.

Also, it perhaps would be a still further finish and improvement of the examination to supplement these perpetually recurring examinations by a final and practical, and by no means formidable one, by the board employed to confer the degree or licence.

In conclusion—and with every apology for the error if I am wrong in introducing such matters into this letter—I would add that I have long thought that we would do well to imitate the usages in conferring the corresponding titles of D.D., or LL.D., or D.C.L—or of Serjeant-at-Law—or as the higher titles in the army and navy; such titles being reserved as conspicuous distinctions, and never bestowed on young men at all, either of twenty-one or twenty-four. Such a proposal, of course, involves a very great inroad on our present usages, but that is perhaps not a valid objection if there be no other.

I really feel convinced that much of the equivocal position of the members practising our profession depends on the utter confusion arising in the public mind, from the fact of the title that should indicate the possession of superior attainment and experience, being legally and as it were *de jure* possessed by a comparative stripling, while many highly accomplished and allowedly skillful men are met with who have it not, but whose innate superiority, national—European may be—makes them inexpressibly respected alongside some struggling insignificant "Doctor."

Could the title not be reserved for presentation to approved authors and important discoverers and improvers—unattainable, saving as an act of grace and a high honour?

ERNEST HART, Esq., *London.*

1. In answer to the circular of the Committee, I beg to reply briefly and in outline on some of the subjects mentioned, and in accordance with views which I have been led to form from watching the means and character of medical education and examinations in London, which, as Dean of a young and carefully organized medical school, I have had special reasons to observe.

2. I believe that all the scientific subjects (Anatomy, General Anatomy, Physiology, Chemistry, Materia Medica, Practical Pharmacy, and, in a great measure at least, Forensic Medicine) are best taught by practical instruction. By this I mean that they should, as far as possible, be taught to limited

classes in laboratories and working rooms, from the actual objects spoken of, and by the performance and repetition by the students of the processes described. Thus Anatomy should be taught wholly by demonstrations, the subject of demonstration to be announced beforehand, and the accepted passages of text-books referring to it also given out beforehand, and the parts to form the subject of teaching should be before the students, and in the case of bones, &c., in their hands. The demonstration should be half examination, and should always imply and require that the students attending had got up the book-description before entering the class-room.

I may mention that at St. Mary's Hospital medical school we have placed the subject of General Anatomy in the hands of a special teacher, requiring attendance on his teaching as a part of the attendance on Anatomy. His class is divided into manageable numbers, and his demonstrations are given in a working room, fitted up with microscopes for the purpose, the men being seated at tables, and taught to prepare and examine for themselves the tissues described. This works well, but as attendance is not really required by the college there is a tendency on the part of the idler class of students to shirk it.

3. Chemistry should, I think, be wholly taught in the laboratory, and much more thoroughly taught than it is now. If four years be actually given to hospital and school work—instead of two years and a half, which is the general rule at present—at least double the time now allotted should be given to Chemistry, and the whole of the time should be spent in real work at the chemical bench. For this purpose it is very desirable that a preliminary knowledge of elementary Chemistry should be demanded of all students entering the profession, such as at present is required by the University of London for its matriculation examination.

At St. Mary's Hospital medical school we have a fourth lecture now each week on Physics, added to the chemical course; and it seems very essential that all medical students should have some knowledge of Physics. We make it a condition of signature for the chemical course for all students, but in doing so we go perhaps beyond the requirements of the London College of Surgeons.

The whole of the first two years might with advantage, I think, be given up to those scientific subjects, Comparative Anatomy being taught to those who seek higher degrees at the same time.

Medicine, Surgery, and Midwifery, theoretical and clinical, might be the exclusive study of the last two years. In teaching these subjects, Medical and Surgical Anatomy should be systematically and practically demonstrated in the wards and in the dead-houses, and Pathological Anatomy should be added to the instruction of the latter period.

The main element in the teaching should be clinical. Clinical teaching, as it is now conducted in many of our largest schools, I regard as of value to only a very small number of the pupils, and to the great body merely a name

and shadow. "Walking the hospital" is useless, or nearly so, to two-thirds of our students. The precise method of clinical teaching which should be adopted must vary with the number of teachers and students relatively, and the particular method of the teacher.

The first step is to provide that the physician or surgeon really teaches, and does not merely 'go round.' The second is to arrange that the student shall attend really and continuously for a definite time the same teacher; and the third, that there shall not be at any one time a more than manageable number of students pretending to give clinical attendance and to be receiving clinical instruction.

For this purpose at St. Mary's Hospital we divide our students into batches, according to their year or standing. We assign to each physician or surgeon for a definite period (three months) a certain number of students. The lists are suspended in the hall, and the surgeons and physicians are provided with a marking-card on which the names are marked. These are called in by the Dean each three months, and renewed with a different series of students.

This involves labour, but it renders clinical teaching a reality.

The amount of teaching, however, is increased by utilizing the out-patient departments, and might be very much more so if the colleges would require a certain attendance in the out-patient departments (where most useful knowledge is to be gained) as well as the in-patient wards.

Efficient clinical teaching would require an addition to the number of out-patient officers in many institutions.

5. The colleges do not require or recognize any attendance on such wards and out-patient departments as those for diseases of the eye, where these are separate from the general wards. The result is that a large proportion of students neglect the study of these diseases. The same observation applies to the diseases of women and children.

6. I believe that if the system of examination could be perfected, much of this strict compulsory attendance might be dispensed with, as is now done by the University of London. But so long as the colleges pretend to make attendance compulsory on those branches of knowledge on which they examine, they cannot fairly and fully examine on branches of knowledge not included in their schedules.

The points to which I believe most importance should be attached are—

1. The actual devotion of four whole years to study in the hospital and school.
2. The improvement of chemical and scientific teaching, by giving more time, and conducting it by practical work in laboratory and class-room.
3. The introduction of a system of real clinical teaching, instead of the present habit of making observations to a constantly changing and often too numerous class.

4. The utilization of the out-patient department, and of the special departments.
5. The improvement and multiplication of examinations, and especially the universal introduction of strict clinical tests.

If in the above memorandum I have been led to refer specially to the practice of our own school at St. Mary's, it is because I was anxious to show how far a practical experience supported the views which I have advanced.

REPLIES NOT RECEIVED IN TIME FOR INSERTION IN THEIR PROPER PLACES.

CHEMISTRY.

Dr. ODLING, F.R.S., *London.*

It seems to me that there are several subjects of the medical curriculum which derive no advantage, but rather positive disadvantage, from being taught in connection with an hospital and with the practice of Medicine and Surgery; and among these I certainly include elementary Physics and Chemistry.

A thorough knowledge of Chemistry is becoming daily of more and more importance, and its study less and less able to compete with that of strictly medical subjects.

Regarding the medical profession as essentially a natural-science profession, it would, in my opinion, be most desirable that students, before entering at the different medical schools, should be required to give evidence of having had a good natural-science education, and of possessing a sound knowledge of elementary Physics, Chemistry, and Natural History. Speaking from the remembrance of my own first medical studies, of my tolerable knowledge of Chemistry and Physics, and my thorough ignorance of Natural History, both botanical and zoological, I feel very strongly that an acquaintance with the leading principles, facts, and applications of all three branches of knowledge is an essential antecedent to the proper study of Human Anatomy and Physiology, as well as to that of Materia Medica.

So far as Chemistry is concerned, I think it would be better for students to enter at the beginning of the Summer Session ; and in any case, to devote their first Summer Session to the study of the preliminary sciences, with the possible inclusion of human osteology. Supposing them to have passed a satisfactory examination in Chemistry, they might confine themselves chiefly to work in the laboratory. Supposing them to be as unacquainted with Chemistry as they usually are, it would be essential for them to be taught

Chemistry, at least simultaneously with their laboratory praetice; and I am satisfied this would be mueh better done by half-hour demonstrations and examinations five or six times a-week, made to and of small sets of men, than by an hour's leeture, three times a-week to large elasses.

By being required to get up definite portions of book Chemistry from day to day, and simultaneously working in the laboratory, I believe that ordinary students might easily learn all that was neeessary to be taught them :

1. Of the detailed Chemistry of the prineipal non-metallie and metallie elements, and their eombinations with eaeh other.
2. Of the elementary analysis of ordinary salts, and the qualitative testing of poisons, blood, and urine.

In the ensuing Winter Session, students who had gone through a summer's Chemieal study and praetiee, should attend a systematie eourse of leetures on Chemistry upon three days a-week for the entire session, ineluding weekly or fortnightly examinations, these examinations being preferably made of sub-divisions of the elass, and not neeessarily lasting the full hour.

The subjeet exeluded from the eourse of leetures should be the detailed Chemistry of the non-metallie and metallie elements whieh now usually oeeupies three-fourths of the session. The subjeets ineluded should be, I eoneeive—

1. The general prineiples of Chemistry.
2. Organie Chemistry ; not all the detail of horrible formulæ to be found in the text-books, but a general aeeount of the most important organie substanees, their elassifieation, relationships, and metamorphoses.
3. Animal Chemistry, ineluding the animal fluids, the tissue eonstituents, and the erystalline produets of the metamorphosis of tissue not previously deseribed.

Many students would probably be glad to have a seeond summer in the laboratory, in order to work at volumetrie and simple gravimetrie analysis. Also, to attend, more or less eompletely, the winter leetures during a seeond session ; but this should, I think, be left to themselves. I limit the Praetieal Chemistry to the summer, ehiefly beeause I do not suppose that, in any medieal sehool, Praetieal Chemistry eould flourish simultaneously with Praetieal Anatomy ; and partly beeause an overworked teaeher (and, as all ehemieal teaehers are, an underpaid teaeher) is not likely to be an effieient one.

I think I have now answered all the queries of the Committee.

MEDICINE AND CLINICAL MEDICINE.

Dr. WILSON FOX, *London.*

1. It would appear to me that the difference between the topics of Medicine and Clinical Medicine depends on the fact that the latter consists, on the part of the student, in a special study of individual cases of disease—the former embraces a systematic review of the nature of disease and also a special knowledge of those of particular organs.

As the student is supposed to enter his third year unacquainted with the nature of disease, I think that some preliminary instruction of an elementary kind, in pathology, etiology, and nosology, should precede the lectures on the diseases of particular organs. The subjects, however, here indicated must necessarily only be briefly treated of; and their importance appears to demand that they should be made the subjects of special courses. As however, this subject will be probably fully dwelt upon by teachers of medicine, I do not think it necessary to make further remarks upon it.

2. I think that the third and fourth years should be exclusively devoted to the study of Medicine and Surgery respectively in their different branches. Systematic lectures in both may be attended in the third year, and with advantage; for to whichever the student first devotes his practical attention in the hospital, he will, in the subsequent years, be able to apply in the wards the instruction which he has previously received from lectures on the other of these subjects. It does not appear to me desirable that he should attempt practical work before his third Winter Session, with the exception that possibly he may be able to gain some elementary notions of surgical practice in the out-patient department during the Summer Session of his second year; though, if he be a candidate for the degrees of the University of London, this would appear to me to be unadvisable. I think that, on the whole, his fourth Winter and Summer Sessions, or his third Summer and fourth Winter Session,* are the periods which a student can most successfully devote to the practical study of Clinical Medicine, since the knowledge of disease, acquired by the study of Surgery, being in many respects more open to direct observation, is a favourable initiative to the

* It is desirable that in his fourth Winter and Summer Sessions he should be placed in direct charge of patients either as house surgeon or as physician's assistant.

study of the nature of the comparatively more obscure diseases which occur in medical practice.

3. I think that a special formal course of lectures on Medicine is desirable in each medical school. Without entering upon the whole question of formal lectures, I may say that this subject, when ably treated, has appeared to me from my own experience when a student, and also from recent observation, to be capable of being impressed by lectures upon the mind of the student more deeply and systematically than by mere reading.

Instruction in Clinical Medicine requires a different method in this respect, that it allows both of direct personal instruction at the bed-side, and also of lectures, founded on individual cases and treating of their relations to other cases of the same or of different classes, and illustrating special points in diagnosis, prognosis, pathology, and treatment.

I think, however, that the first-named of these methods is that which deserves the greatest pre-eminence. A student practically unacquainted with the features of disease, and with the signs by which it may be recognized, requires that these should be pointed out to him, individually in each particular case. He requires to be taught to appreciate their significance, not only as signs of disease in general, but also as characterizing particular disorders. In fact, the great duty of the clinical teacher appears to me to be to cultivate the powers of the student both in observing and also in drawing conclusions from what he observes.

In University College a special professor is appointed for the specific purpose of training the students in the practical study and of disease at the bed-side. The method which has there been adopted, and is still pursued, is for this professor to commence both the Winter and Summer Session with a course of practical instruction on the methods of physical diagnosis. The continued repetition of this course is rendered necessary by the fresh and untrained students coming to him for instruction. Further instruction is given as, cases permit, on the examination of the urine, and on the use of the thermometer, of the laryngoscope, and sphygmograph, &c. The method of instruction which I have subsequently found to work best is twofold. The first consists in the adoption of the plan pursued at some continental schools, and also by Professor Bennett of Edinburgh, of calling upon an individual student to examine a case in the presence of the class or of the professor. The professor directs the student's inquiries, pointing out, as they are observed, the leading features of the case and their general significance; but this should, in my opinion, be done, as far as possible, through the medium of the student who is, for the time being, practically in charge of the case; the information thus imparted being conveyed by means of questions directed personally to him.

The attention of the rest of the class is kept alive by special signs or symptoms being directly demonstrated to some or all of the other students:

questions may also be addressed to others than the gentleman examining the case. When his examination is concluded it appears to me advisable that a short clinical lecture should be given by the professor on the spot, dwelling on the salient features of the case, its relation to other cases of the same class, and on any peculiarities requiring diagnosis, or on special circumstances requiring treatment, and to some degree on its pathology and etiology. The students should be encouraged to take notes, both of the phenomena presented by the patient and of the remarks made by the teacher.

The second method at present followed at University College was first introduced by Professor Reynolds, when occupying the special professorship to which I have alluded, and has since been continued with, I believe, very favourable results; it is, that each student should be encouraged to write at least one report weekly of a case specially allotted to him. The report is expected to be full, from personal observation of the patient, and is to be accompanied by a commentary embracing the diagnosis and the grounds on which it is based, by a short sketch of the pathology and of the prognosis and treatment, together with the reasons for these, including also properly written prescriptions. For this purpose the students are permitted to attend and examine patients in the wards during the morning, under the general superintendence of the physician's assistant, whose duty it is to see that the patients do not suffer from methods of examination conducted without sufficient experience. The student is allowed to use any books he pleases in the preparation of these reports, in order both to extend his personal observations and to improve his knowledge and reasoning powers. The reports are handed weekly to the professor, who corrects them and returns them to the students, and, when necessary, points out in the cases themselves errors in observations or diagnosis on the part of the student. It is both gratifying and at times almost surprising to observe the rapid progress which many students make under this system, and by a judicious selection of cases, the leading features of the principal diseases of all the different organs may thus in one session be brought closely under the attention of each industrious student. Prizes and certificates of honor are given both in the winter and summer sessions for the best sets of reports so presented during these sessions.

While these studies in the wards are being conducted the student should at the same time attend in the out-patient department, to make himself familiar with the simpler and more ordinary forms of disease, and here a very similar system should be pursued. The physician in charge should request the one or more students to examine each case as it presents itself, before inspecting it himself. He should, before proceeding to examine it, enquire the results of the students' examination, and in the course of his own investigation he should point out to them features which they have overlooked or wrongly appreciated; a short summary of the treatment should be given with each case, and the students should as far as possible be made to

write prescriptions under the eye of the physician: such cases may then with advantage be placed under the charge of more advanced students, who may in some instances visit them at their own homes, reporting to the physician their progress, and consulting him respecting their treatment. I have found this method useful in awakening a very intelligent interest on the part of the student. It is impossible that the instruction here given should be as detailed and elaborate as in the wards, but a habit of precision and quickness of observation is thus acquired by the review of a large number of cases under the eye of a careful teacher.

In the case of the death of patients in the hospital, the physician in charge should always be present at the inspection of the body, and should point out to the class the verification or otherwise of his diagnosis, and the bearing of the morbid appearances upon the phenomena observed during life.

It is desirable that after some preliminary practical education such as those here indicated, the student should be placed in more immediate practical charge of patients. His first position of this kind is that of a clinical clerk who makes reports under the direct superintendence of the physician, or conducts special observations under his direction. Subsequently he should, if possible, obtain the post of physician's assistant. In University College these gentlemen are appointed by competitive examination. One is appointed to each physician, and holds office for a period of six months. He resides in the hospital and has the charge of all the patients under the care of his superior, and is expected to report fully to him on their condition at his visits. Before entering on his resident duties he is expected during three months to attend and assist the physicians in charge of the out-patient department: by this means all the more intelligent and advanced students have a large opportunity for acquiring a practical acquaintance with disease, and also a certain sense of the responsibility attaching to its treatment.

FORENSIC MEDICINE.

Dr. GEORGE HARLEY, F.R.S., *London.*

In reply to your inquiry regarding my views on the mode of teaching Forensic Medicine, as well as the topics which may be most advantageously included under that head, I beg to say at the outset, that in my opinion the title of Forensic Medicine or Medical Jurisprudence might be changed with advantage to that of State Medicine, as neither of the former titles adequately express the true nature and scope of a course destined to qualify medical men for the performance of certain important public duties.

The course, whose title as I have already said, would be more appropriately that of

STATE MEDICINE,

should embrace

1. Toxicology.
2. Insanity; (not only Criminal Lunacy, but the general principles upon which the detection and distinction of the various kinds of insanity are based—in a word such knowledge as ought to be possessed by every commissioner of lunacy).
3. Injuries against the person (examination of injuries; *post-mortem* examinations; drawing up of reports; &c.)
4. The principles of life insurance.
5. An exposition of medical evidence in courts of law, its nature and value, and such other information as is required of medical witnesses and of coroners.
6. Sanitary science—an exposition of the principles of medicine in relation to the conservation of the health of individuals and of communities, such as is necessary to medical officers of health.

In fact the course of State Medicine ought to be one which would educate medical men to fill with honour to themselves, and advantage to the public, offices such as coroner; commissioners in lunacy; medical officers of health; poor law inspectors; inspectors of vaccination, of delcterious trades; and all other such like offices in which medical knowledge can be made subservient to the requirements of the state.

The course might consist of from forty to fifty lectures, and be given either during the second summer or third winter term.

As regards the manner in which it can be best taught, it is, in my opinion, by class demonstration, and lectures copiously illustrated by models, drawings, charts, preparations, and chemical experiments.

The toxicological part of the course should be further illustrated by experiments on the lower animals, showing the physiological action, toxic effects, and *post-mortem* appearances produced by poison, as well as the processes necessary for its extraction from the animal tissues and fluids. It being impossible to illustrate the action of every poison in this way, the teacher can readily select typical specimens of particular groups of toxic agents, and limit himself to the practical illustration of their effects, pointing out in what way they agree or differ from other members of the same and other groups.

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APPENDIX II.

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I.

MEDICAL TEACHERS' ASSOCIATION.

REPORT by the Council of the Association, on the present obligatory Conditions of Study for the Medical Profession, and on the Constitution and Relations of Medical Schools.

I.—The reference on which this Report is made was resolved by the Association, on March 23rd last, in the following terms:—"That it be referred to the Council to consider the conditions of study now imposed on candidates for the medical profession in this country, and to report to the Association, at or before the next annual meeting, whether in their opinion any, and if any, what changes ought to be made in those conditions; and also, whether, with a view to improving Medical Education, it would be desirable to make any alterations in the present constitution and relations of the medical schools in London." In connection with this reference, we also received from the Association some draft Resolutions which Mr. Rivington had proposed on the subject of the medical curriculum; and likewise a Report, which had been made by a Special Committee, on the out-patient practice of hospitals in relation to medical teaching.

II.—In responding to the reference which has been made to us, we do not propose to discuss the abstract question, whether, under very different circumstances to those which actually obtain in this country, Authorities licensing for the medical profession might with advantage rely exclusively on the completeness and stringency of their own examinations as tests of the competency of candidates; and might, with this reliance, leave each student altogether at liberty to determine for himself the conditions of time, place, and manner, under which his necessary knowledge should be acquired. We assume that in this country, under present circumstances, the principle of so-called "free studentship" could not be generally adopted; and we accept as our present basis, that every student wishing to offer himself for examination under the Medical Act in order to obtain his licence for practice must in the first instance show that he has gone through such a course of study as will probably have qualified him for the licence. In taking this basis, however, we feel bound expressly to point out that it cannot properly be made a ground for any illusory requisitions. In proportion as examining boards are obliged to supplement their examinations

by any kind of collateral evidence, the quality of such evidence tends to be a matter of little less public concern than the quality of the examinations themselves; and every certificate which is accepted in aid of a system of examination ought to be a certificate either of actual attainment of the knowledge in question, or at least a certificate of genuine and presumably sufficient study.

III.—In proceeding to comment on the present conditions of candidature for the medical profession in this country, we first have to remind the Association that there does not yet exist, either by authority or by common consent, any one set of regulations which can be cited as representing the national minimum of requirement in this matter; that, on the contrary, the nineteen different corporations which give admission to the *Medical Register* (and in very great part only by half titles to general practice), act in virtual independence of one another, each with its own set of conditions; that, for instance, our London pupil, who would commonly purpose to procure, as his minimum title to general practice, the two semi-qualifications of the College of Surgeons and Apothecaries' Company respectively, or of the College of Surgeons and College of Physicians respectively, cannot find a set of conditions common even to his two co-qualifying corporations, but must let his education advance, as it best can, under direction of two unassociated, not to say conflicting, taskmasters. The above-described state of things is one which we regard with extreme regret and disapproval. We do not question the right of each corporation to fix for itself any special conditions under which it will award such distinctive higher titles of honour, medical or surgical, as may be in its gift; but we think it self-evident that such titles ought only to be awardable to persons already registered, or entitled to be registered, in respect of having passed a minimum examination common to all departments of the profession; and we hold it to be essential to any improved system of Medical Education, that the conditions of mere (minimum) admissibility to the *Medical Register*, both as regards examination itself, and as regards proofs of previous study, should not as now be different at different examining boards, and be in a great degree variable at their separate option, but should be fixed from time to time, by the General Educational Authority, in one common code of regulations. To procure this simplicity of government for our profession, has been, for longer than living memory, the endeavour of all intelligent medical reformers, both primarily in order to a better conduct of Medical Education, and ulteriorly for the better fulfilment of our relations to the public: to promote its adoption was the main purpose with which the Medical Act of 1858, with its expensive consultative machinery, was advocated: and we think that our medical schools, no less than the general public, may reasonably complain that, ten years after the passing of the Act, the old chaos of rules and qualifications is still continuing as before.

IV.—For the purposes of the present Report (written with particular reference to Medical Education in London) we may conveniently advert to the regulations of the College of Surgeons and Apothecaries' Company, as those which are of most practical influence, and as representing jointly the kind of law under which our profession has to be studied. The total of professional education to be required as minimum qualification from the candidate for general practice (excluding his so-called preliminary education) is distributed under eighteen different heads, strictly marked off from one another, and generally with a definite length of supposed teaching allotted to each :—(1) Anatomy by systematic lectures, (2) Anatomy by dissections, (3) Chemistry by systematic lectures, (4) Chemistry practically in laboratory, (5) Botany, (6) Physiology, (7) Materia Medica by systematic lectures, (8) Materia Medica by apprenticeship or otherwise as Practical Pharmacy, (9) Surgery by systematic lectures, (10) Surgery by hospital attendance and clinical lectures, (11) Surgery by acting as dresser or otherwise in charge of patients, (12) Medicine by systematic lectures, (13) Medicine by hospital attendance and clinical lectures, (14) Midwifery by systematic lectures, (15) Midwifery by attendance on cases, (16) Vaccination, (17) Morbid Anatomy, (18) Forensic Medicine. Under nine of these heads the student must be certified to have "attended" systematic courses of lectures of definite length, and in four of the nine to have "attended" the systematic courses twice over in successive years; also, in regard of Hospital Practice and Clinical Lectures, he must be certified to have attended during two years for Medicine, and during two and a half years for Surgery; his "instruction" in Practical Chemistry and "study" of Practical Pharmacy must each be certified to have been of three months' duration; and his midwifery cases and vaccinations must have been not less than 20. Certain of the subjects must be taught only from October to March inclusive, certain others only from May to July inclusive. Twice in each year the student must register at each of the two institutions his attendances on lectures and practice, and he must also have registered his studentship at the office of the General Medical Council. His schedule of certificates for the College of Surgeons has 19 separate sections, his schedule for the Apothecaries' Company has other 19 : with only very small exceptions, all 38 must have been separately signed by teachers in recognized medical schools; " and certificates as to the nine kinds of systematic lectures must have been given by at least eight different persons. As introductory to these detailed regulations, there are the following general rules, unfortunately not identical for the two licensing corporations :—(1) that the candidate-apothecary must have been for five years an apothecary's apprentice, and have attended a medical school for three years; and (2) that the candidate-surgeon must have been for at least four years engaged in the acquirement of professional knowledge, and have attended a medical school for at least two and a half

years of the time. Each board divides its examination into two parts: but the student is not in either case under any obligation to have an interval between the two parts of examination.

V.—It seems to us that these regulations are in general needlessly minute, and in some respects improperly stringent; and that, while in this sense they interfere objectionably with the freedom of those whom they affect, the elaborate machinery of certificates and registers, which purports to be their security for good education, is in itself as deceptive as it is troublesome. For the certificates do not even professedly vouch for more than the mere bodily attendance of students on various occasions of teaching, and in reality (as the Licensing Boards are well aware) mean little or nothing else than that the student has paid such fees as have entitled him to attend the courses in question.

The excess of regulation is the essential evil. For of all the regulations it has to be remembered, that they relate not to ends, but only to means: not to the actual possession of knowledge (for which the appointed control is examination) but only to modes in which knowledge may be acquired; and there can hardly be a greater fault in legislation than to over-multiply and over-magnify ordinances of this secondary sort. We hesitate to say that any such regulation ought to be universal; and those which we think may be almost universal are few and simple. As four well-employed years certainly represent the least time in which a young man of good ability and with fair preliminary education, can moderatly well acquire the knowledges which are now supposed to be learnt in the medical curriculum, so examining boards (if only to protect themselves against swarms of half-educated applicants) must almost necessarily require every candidate to give proof of thus much professional study; and as it is evident, with regard to the cheif part of the knowledges, that practically they are not to be learnt except in certain properly constituted establishments, so it is no hardship on the student to require proof at his hands that his studies, for (say) three years of the time, have been is such an establishment: the the responsibility of "recognizing" which, as duly constituted for its purpose, must of necessity be vested in the authority which governs the education. Yet even in applying propositions of this great breadth, caution against over-stringent regulations is not superfluous. Every possible latitude of choice, consistent with the supposition of *bonâ fide* study, ought to be allowed as to modes and places of education. To insist unconditionally on attendance on systematic courses of lectures (to the ignoring of systematic reading and other modes of study by which the same sort of knowledge may be acquired) is, we think, wrong; and we are also of opinion that no student ought to be forced to learn in any specific establishment anything which he can reasonably be supposed able to learn elsewhere. Thus, if a student prefers to learn Botany or Chemistry elsewhere than in a medical

school, he ought, in our opinion, to be free to do so; and if he prefers to get his systematic view of Surgery of Materia Medica by reading printed text-books of those subjects, rather than by having (so to speak) the same text-books read to him by lecturers, we see no reason why he should not be let act upon his option.

Similarly we are of opinion that neither the central Authority's power of withholding "recognition" from a medical school, nor its power of making detailed requisitions from candidates for examination, ought ever to be so applied as to enforce that in indifferent matters all schools shall organize their teaching on the same pattern. In this point of view we object to the minuteness with which the present system insists on its particular subdivision of the subject-matters of medical teaching, and on the number of lectures to be given uninterchangeably under each of a great variety of heads, and on the giving of certain lectures only in one special part of the year, and so forth. We have already suggested that very undue importance is attached to systematic courses, as contrasted with other modes in which knowledge may equally well be acquired; and a fixed general law that the same systematic courses must be attended twice over in successive years is, in our opinion, preposterous.

It seems to us that central regulations tending to influence plans of education ought not to be conceived in this extremely narrow spirit; that such regulations cannot properly aim at more than to provide for the broad necessities of the case, including such few first principles of method as would universally be deemed right and important; that what remains beyond this (and doubtless very much does remain) is matter of internal school-discipline, to be dealt with by each school in its own way.

VI.—The only sort of regulation tending towards detail, which we think might be of universal application, would be to prevent as far as possible certain gross confusions of study. If the candidate is to be required to show that he has spent at least four years in studying sciences and practice, it ought we think to be made incumbent on him to give his various proofs of study progressively, and at intervals, during that time. At present, in the case of a considerable proportion of students, the first year or eighteen months of the supposed four years of study may be spent in ways which it would be flattery to call educational; and then the very extensive and complex curriculum of the examining boards has virtually to be got through in three, or two and a half, years—a time so utterly insufficient for its professed purposes, that almost of necessity the student falls into inextricable confusion of thought, and emerges at length with but more or less smattering of the knowledges which he ought to have acquired. Regulations allotting particular studies to particular periods of studentship are useless unless they be enforced by such corresponding compulsory subdivisions of examination as shall insure that the student learns in each period the matter which he is expected to learn; but, if so enforced, they represent in our

opinion the best mode in which compulsory influences can be applied to details of medical education ; and we are of opinion that compulsion of this sort, provided it be not too detailed, may very properly and expediently be made part of a code of general regulations. The various special knowledges which are at present required as minimum qualification for entering upon practice (in addition to the proofs of preliminary education) may be classified under three heads, as follows :—first, certain general scientific knowledge ; second, anatomical and physiological knowledge ; third, pathological and practical knowledge :—the first, as to Botany. Physics, Chemistry, and, if the University of London is the examining board, Zoology ; the second, as to Anatomy, topographical and structural, and Physiology with Physiological Chemistry ; the third, as to Pathological Anatomy, Pathological Chemistry, Principles and Practice of Medicine, Principles and Practice of Surgery, Principles and Practice of Midwifery. Pharmacy, Forensic Medicine. It would, we think, be a proper compulsory principle, that the student should not be allowed to count study in the second of these divisions till he had shown himself proficient in the first, nor to count study in the third till he had shown himself proficient in the second. Also the least number of years (say four) which a student is required to give to medical studies might so far be compulsorily allotted in divisions, that the third examination should not be permmitted till two years after the second, nor the second till one year after the first.

Whether any general regulations beyond such as the above can conduce to the real success of Medical Education seems to us extremely doubtful. Any one who will consider, for instance, what total of subject-matter has to be treated under the two heads of Anatomy and Physiology, will see that the total might be very difierently divided in two different schools, and yet be equally well taught in both. Still more, any one who will consider what total of subject-matter has to be taught under different heads of pathology and practice will see, first, that a division of systematic courses of lectures into the five sections of Materia Medica, Medicine, Surgery, Midwifery, and Forensic Medicine, is by no means the only division which could be deemed reasonable ; and secondly, that even the total of systematic courses might be of very different magnitude in two different schools according as departments were more or less developed for various sections and subsections of clinical instruction, for Practical Pharmacy, for laboratory analysis, &c. &c. These are details in which it would seem best, not that all schools should be subject to one rigid rule, but rather that all should be as free as possible to choose the particular machinery wherewith honourably to compete for the character of given good education. A well-manned school, put on its mettle, might be expected to improved very greatly on many present arrangements ; especially by the lecturers concerting that their courses, both in extent and in succession of parts, should properly fit into one another, instead of being

(as now) almost independent performances, with a vast deal of overlapping and repetition, and sometimes not a little mutal contradiction. Of the valuable suggestions recently made by Dr. Parkes for the improvement of medical education, many in our opinion are not suitable matter for universal central regulation, but are eminently such as might be realized in schools competing with one another under a system which should leave to them for all minor matters the largest possible amount of free action.

VII.—If then we assume that the knowledges to be required from the candidate for minimum qualification in the profession are still to be, in kind, those which the present London regulations purport to require. our curriculum, briefly stated, and subject to reasonable provision for exceptional cases, would be this. The examinations to be passed by the candidate would in all be at least four in number;—first, in common preliminary education; second, in preliminary scientific education—the Chemistry, Physics, Botany and Zoology, of the present system; third, in Anatomy and Physiology; fourth (which might perhaps have to be subdivided) Materia Medica, Pathology, Forensic Medicide, and the several departments of practice. To the fourth examination he would not be admissible till at least two years after the third, nor to the third till at least one year after the second, nor to the second till at least one year after the first. Thus is four years would have been used methodically. To at least the first and second examinations he would be admissible on the principle of "free studentship"—*i.e.* without being required to adduce evidence of having learnt in any particular way, or in any particular establishment. Chemistry and Physics, Botany and Zoology, would in this respect be on the same footing as English and Latin and Arithmetic. For admisibility to the third examination he would have to produce a certificate from "recognized" teachers that he had for at least one year, since the date of his second pass, studied Anatomy and Physiology under their direction, according to the method of their school, and he had done so to their satisfaction. Similarly, for admissibility to the fourth examination, he would have to produce a certificate from "recognized" that he had for two years, since his third pass, studied pathology and the several branches of practice under their direction, according to the method of their school, and had done so to their satisfaction; and for this examination he would also have have to show that he had attained the age for legal responsibility. Whether the final examination should, to complete it, involve some sort of recapitulatory examination in matters of previous passes, is *à priori* doubtful; but we incline to recommend that at any rate it should not generally do so with the minuteness of the original examinations.

VIII.—Securities for the proper working of such a system as the above may be looked for in three different directions: first, namely, in the guardedness of "recognition;" second, in the efficiency and strictness of examining boards; third, in the legitimate competition of schools: but it

is on the second and third of these influences, and especially on their conjoint operation, that we would almost unreservedly rely. Each of the three points, however, requires to be separately considered.

1. As regards the "recognition" of schools, we have already suggested that this discretion ought to be vested in the General Educational Authority, rather than in a number of unconnected corporations, and we would wish to see it exercised in the most liberal spirit. We of course know that, if schools are over numerous, those who conduct them must be proportionately ill-paid; but any direct restriction of numbers is impossible as regards the claimants of recognition, and to attempt it would contravene first principles of public policy. The only right and possible restriction on numbers is to make sure by indirect ways that ill-conducted schools shall not be commercially profitable: for, if this result can be attained, such schools will have no inducement to arise, and the supply of good schools will numerically adjust itself to the demand. In this respect it would be a great gain that compulsory regulations should not, as now, artificially force the multiplication of lectureships. And though Mr. Rivington's proposal, that certain branches of the curriculum should not be taught in separate medical schools but only in one central establishment, is of a sort which in our opinion lies far beyond the province of direct regulation, we would gladly see schools left in greater freedom than they virtually now have, to make such voluntary arrangements as would tend more or less completely to realise Mr. Rivington's object. We would propose that the recognizability of medical schools should be in divisions corresponding to the divisions of examination—that a school should be recognizable as a School of Pathology and Practice, or as a School of Anatomy and Physiology, or as both. A school applying for recognition in either capacity, or in both, would have to show itself, to the satisfaction of the Authority, possessed of all requisite means and organization for properly teaching whatever it claimed to teach; and the Authority would also have to see, in some detail, that the instructional programme of the school thoroughly covered the ground in which students would be entitled to expect instruction. Some establishments might care only to act in one or both of the strictly medical capacities, for which alone "recognition" would be necessary; but others, at their own option, might also have their respective sections of preliminary science, which, for obvious reasons, if they were well-conducted, would no doubt still (though without compulsion) be the almost invariable resort of first year's students; and finally some few establishments (as is now the case with King's and University Colleges) might happen also to have common preliminary education attainable within the same walls as the scientific and technical education.

2. The most important aspect of the question of Medical Education is not as to the forms and processes which candidates shall go through, but as to the intellectual fruits which they shall ripen; for the forms and processes

will sooner or later regulate and adapt themselves, to secure whatever results must be attained as the end and aim of the curriculum. These (broadly speaking) are such results as shall satisfy certain examiners: and whether the process of education truly gives fruit according to its programme, whether the knowledges nominally claimable of the student are knowledges really acquired by him, is an issue which will be mainly contingent on the mode in which examinations are conducted. We therefore cannot too strongly express our opinion that a lax or incompetent administration of this great trust is among the most grievous wrongs which can be inflicted on our profession and the public. Not only with reference to the ultimate aim of securing in the public interests that only well-qualified candidates shall recruit the ranks of our profession, but equally with reference to the mediate aim (now specially under our notice) of securing that medical schools shall be well-conducted, it is, in our opinion, of the very first urgency that nothing approaching to inefficiency should be tolerated in any board of examiners. Especially, too, the reforms which we advocate depend so very much for their possibility on the confidence with which examinations can be regarded as adequate tests of education, that we are forced to insist on this point. We cannot conceive that public interests are properly cared for, where large permanent boards, with no distribution of subject-matter, conduct their whole range of examination equally by all their members: believing, as we do, that every subject which ought to be separately taught ought also to be separately examined in, and that the examiner in each subject should represent as far as possible the very best special knowledge of the time. And we also think it very important that examiners should as far as possible be so appointed as not to have any pecuniary interest in the number of accepted candidates.

Here, too, we have to add another important qualification. We are of opinion that the controlling Authority ought to define with very much more precision than is now used, within what area of knowledge candidates for minimum qualification are to be examined,—to what exact extent in Chemistry, to what exact extent in Physiology, to what exact extent in Forensic Medicine, and so forth. We would insist that examinations should be thoroughly searching and strict within the area to which they purport to extend; and it is in order to this object that the examiner's requisition of knowledge should in the first instance be well defined. The present programme, unless it be understood with modifications which are not expressed in it, is, we think, too pretentious for its object. We cannot hope (much as we might wish) that every one entering upon practice in the United Kingdom shall have thoroughly mastered all the studies which are now nominally comprised in his curriculum,—all the Botany, Physics and Chemistry, all the Anatomy and Physiology, all the Forensic Medicine and Pharmacology, &c.; but if the requisition of the examining Authority in

regard of each such subject-matter were defined in the manner we suggest, a really thorough knowledge within that more limited area might we think be made indispensable, and very advantageously be substituted for smatterings of larger pretension.

3. Subject to the above qualifications, we may now complete our scheme of securities. Schools, constituted as we have described, would be at liberty, under the described conditions, to present their students for examination: and the legitimate competition of schools—competition, namely, as to which of them shall show the best educational results, is the influence which remains to be provided for. The course which in this respect ought in our opinion to be taken, is to provide that returns from all examining boards should annually be made to the general Authority, and by this Authority be published: stating, with all such particulars as might conduce to exact comparison, what had been the proportions of pluck and pass in each class of candidates sent up by the several schools respectively. The public would thus have the best attainable means for forming its own conclusions as to the relative efficiency of each school; and as those conclusions would certainly in the main determine the prosperity of the school, so the interests of the teachers would be very directly identified with the merits of their system of teaching. And thus, in our opinion, Medical Education would be far more likely to improve than under a continuance of the present illusory regulations.

IX.—In concluding our Report, it is perhaps desirable for us expressly to point out that the conditions of qualification to which it refers are exclusively those of minimum qualification for the profession, and that we therefore do not pretend to have exhausted the subject of Medical Education. We, on the contrary, think it incalculably important that persons entering the profession should to the utmost be moved by adequate inducements to continue their education far beyond the comparatively low point at which a standard of minimum qualification must be fixed; and in this point of view the conditions under which the various corporations confer their higher titular distinctions, seems to us only of less public interest than the conditions of minimum qualification. It would, however, be beyond the limits of our commission to enter upon this subject, or to discuss educational provisions (such as of course every first-class school ought to contain) for licentiates who wish thus to extend their studies. And we only advert here to those branches of the general subject, lest it should in any degree be supposed that we have been unmindful of their great importance.

Signed on behalf of the Council,

JOHN SIMON, *President.*

ROBERT BENTLEY,
BERNARD E. BRODHURST, } *Secretaries.*

London, October 19*th,* 1868.

II.

MEDICAL TEACHERS' ASSOCIATION.

REPORT of the Association, on the present obligatory Conditions of Study for the Medical Profession, and on the Constitution and Relations of Medical Schools.

I.—The reference on which this Report is made was resolved by the Association, on March 23rd last, in the following terms:— "That it be referred to the Council to consider the conditions of study now imposed on candidates for the medical profession in this country, and to report to the Association, at or before the next annual meeting, whether in their opinion any, and if any what, changes ought to be made in those conditions; and also whether, with a view to improving medical education, it would be desirable to make any alterations in the present constitution and relations of the medical schools in London." In connection with this reference, we also received from the Association some draft resolutions which Mr. Rivington had proposed on the subject of the medical curriculum; and likewise a report, which had been made by a Special Committee, on the out-patient practice of hospitals in relation to medical teaching.

II.—We accept as our present basis, that every student wishing to offer himself for examination under the Medical Act in order to obtain his license for practice must in the first instance show that he has gone through such a course of study as will probably have qualified him for the license. In taking this basis, however, we feel bound expressly to point out that it cannot properly be made a ground for any illusory requisitions. In proportion as examining boards are obliged to supplement their examinations by any kind of collateral evidence, the quality of such collateral evidence tends to be a matter of little less public concern than the quality of the examinations themselves; and every certificate which is accepted in aid of a system of examination ought to be a certificate either of actual attainment of the knowledge in question, or at least a certificate of genuine and presumably sufficient study.

III.—In proceeding to comment on the present conditions of candidature for the medical profession in this country, we first have to remind the Association that there does not yet exist, either by authority or by common consent, any one set of regulations which can be cited as representing the

national minimum of requirement in this matter; that, on the contrary, the nineteen different corporations which give admission to the *Medical Register* (and in part only by half titles to general practice) act in virtual independence of one another, each with its own set of conditions; that, for instance, our London pupil, who would commonly purpose to procure, as his minimum title to general practice, the two semi-qualifications of the College of Surgeons and Apothecaries' Company respectively, or jointly, or of the College of Surgeons and College of Physicians respectively, or jointly, cannot find a set of conditions common even to his two co-qualifing corporations, but must let his education advance, as it best can, under the direction of two task-masters. The College of Surgeons of England now judiciously refuses to grant its diploma except after an examination in medical as well as surgical subjects, by its own or other examiners. There are other corporations which continue to grant diplomas of one or other character upon partial tests of knowledge. This state of things is one which we regard with extreme regret and disapproval. We do not question the right of each corporation to fix for itself any special conditions under which it will award such distinctive higher titles of honour, medical or surgical, as may be in its gift; but we think it self-evident that such titles ought only to be awardable to persons already registered, or entitled to be registered, in respect of having passed a minimum examination common to all departments of the profession; and we hold it to be essential to any improved system of medical education, that the conditions of mere (minimum) admissibility to the *Medical Register*, both as regards examination itself, and as regards proofs of previous study, should not as now be different at different examining boards, and be in a great degree variable at their separate option, but should be fixed from time to time, by the general educational authority, in one common code of regulations. To procure this simplicity of government for our profession has been, for longer than living memory, the endeavour of all intelligent medical reformers, both primarily in order to a better conduct of medical education and ulteriorly for the better fulfilment of our relations to the public: to promote its adoption was the main purpose with which the Medical Act of 1858, with its expensive consultative machinery, was advocated: and we think that our medical schools, no less than the general public, may reasonably complain that, ten years after the passing of the Act, a greater advance to good government has not been made.

IV.—For the purposes of the present Report (written with particular reference to Medical Education in London) we may conveniently advert to the regulations of the College of Surgeons and Apothecaries' Company, as those which are of most practical influence, and as representing jointly the kind of law under which our profession has to be studied. The total of professional education to be required as minimum qualification from the candidate for general practice (excluding his so-called preliminary education)

is distributed under eighteen different heads, strictly marked off from one another, and generally with a definite length of supposed teaching allotted to each :—(1) Anatomy by systematic lectures, (2) Anatomy by dissections, (3) Chemistry by systematic lectures, (4) Chemistry practically in laboratory, (5) Botany, (6) Physiology, (7) Materia Medica by systematic lectures, (8) Materia Medica by apprenticeship or otherwise as practical pharmacy, (9) Surgery by systematic lectures, (10) Surgery by hospital attendance and clinical lectures, (11) Surgery by acting as dresser or otherwise in charge of patients, (12) Medicine by systematic lectures, (13) Medicine by hospital attendance and clinical lectures, (14) Midwifery by systematic lectures (15) Midwifery by attendance on cases, (16) Vaccination, (17) Morbid Anatomy, (18) Forensic Medicine. Under nine of these heads the student must be certified to have "attended" systematic courses of lectures of definite length, and in four of the nine to have "attended" the systematic courses twice over in successive years; also, in regard of Hospital Practice and Clinical Lectures, he must be certified to have attended during two years for medicine, and during two years and a half for Surgery; his "instruction" in Practical Chemistry and "study" of Practical Pharmacy must each be certified to have been of three months' duration; and his midwifery cases and vaccinations must have been not less than twenty. Certain of the subjects must be taught only from October to March inclusive, certain others only from May to July inclusive. Twice in each year the student must register at each of the two institutions his attendances on lectures and practice, and he must also have registered his studentship at the office of the General Medical Council. His schedule of certificates for the College of Surgeons has 19 separate sections, his schedule for the Apothecaries' Company has other 19. As introductory to these detailed regulations, there are the following general rules, unfortunately not identical for the two Licensing Corporations :—(1) That the candidate-apothecary must have been for five years an apothecary's apprentice, and have attended a medical school for three years; and (2) that the candidate-surgeon must have been for at least four years engaged in the acquirement of professional knowledge, and have attended a medical school for at least two and a half years of the time. Each board divides its examination into two parts: but the student is not in either case under any obligation to have an interval between the two parts of examination.

V.—It seems to us that these regulations are in general needlessly minute, and in some respects improperly stringent; and that, while in this sense they interfere objectionably with the freedom of those whom they affect, the elaborate machinery of certificates and registers, which purports to be their security for good education, is in itself as deceptive as it is troublesome. For the certificates do not even professedly vouch for more than the mere bodily attendance of students on various occasions of teaching, and in reality (as the licensing boards are well aware) may mean little or nothing else than

that the student has paid such fees as have entitled him to receive the instruction in question.

The excess of regulation is the essential evil. For of all the regulations it has to be remembered, that they relate not to ends, but only to means: not to the actual possession of knowledge (for which the appointed control is examination) but only to modes in which knowledge may be acquired; and there can hardly be a greater fault in legislation than to over-multiply and over-magnify ordinances of this secondary sort. We hesitate to say that any such regulation ought to be universal; and those which we think may be almost universal are few and simple. As four well-employed years certainly represent the least time in which a young man of good ability, and with fair preliminary education, can moderately well acquire the knowledges which are now supposed to be learnt in the medical curriculum, so examining boards (if only to protect themselves against swarms of half-educated applicants) must almost necessarily require every candidate to give proof of thus much professional study; and, as it is evident, with regard to the chief part of the knowledges, that practically they are not to be learnt except in certain properly constituted establishments, so it is no hardship on the student to require proof at his hands that his studies, for (say) three years of the time, have been in such an establishment: the responsibility of "recognizing" which, as duly constituted for its purpose, must of necessity be vested in the authority which governs the education. Yet even in applying propositions of this great breadth, caution against over-stringent regulations is not superfluous. Every possible latitude of choice, consistent with the supposition of *bonâ fide* study, ought to be allowed as to modes and places of education.

Similarly we are of opinion that neither the central Authority's power of withholding "recognition" from a medical school, nor its power of making detailed requisitions from candidates for examination, ought ever to be so applied as to enforce that in indifferent matters all schools shall organize their teaching on the same pattern. In this point of view we object to the minuteness with which the present system insists on its particular subdivision of the subject-matter of medical teaching, and on the number of lectures to be given uninterchangeably under each of a great variety of heads, and on the giving of certain lectures only in one special part of the year, and so forth. We have already suggested that very undue importance is attached to systematic courses, as contrasted with other modes in which knowledge may equally well be acquired; and a fixed general law that the same systematic courses must be attended twice over in successive years is, in our opinion, preposterous.

It seems to us that central regulations tending to influence plans of education ought not to be conceived in this extremely narrow spirit; that such regulations cannot properly aim at more than to provide for the broad

neeessities of the ease, ineluding sueh few first prineiples of method as would universally be deemed right and important; that what remains beyond this (and doubtless very mueh does remain) is matter of internal sehool-diseipline, to be dealt with by eaeh sehool in its own way.

VI.—The only sort of regulation tending towards detail, which we think might be of universal applieation, would be to prevent as far as possible eertain gross eonfusions of study. If the eandidate is to be required to show that he has spent at least four years in studying seienees and praetiee, it ought we think to be made ineumbent on him to give his various proofs of study progresssively, and at intervals, during that time. At present, in the ease of a eonsiderable proportion of the students, the first year or eighteen months of the supposed four years of study may be spent in ways whieh it would be flattery to eall edueational; and then the very extensive and eomplex eurrieulum of the examining boards has virtually to be got through in three, or two and a half, years—a time so utterly insuffieient for its professed purposes, that almost of neeessity the student falls into inextrieable eonfusion of thought, and emerges at length with but more or less smattering of the knowledges whieh he ought to have aequired. Regulations allotting partieular studies to partieular periods of studentship are useless unless they be enforeed by sueh eorresponding eompulsory subdivisions of examination as shall insure that the student learns in eaeh period the matter which he is expeeted to learn; but, if so enforeed, they represent, in our opinion the best mode in whieh eompulsory influenees ean be applied to details of Medieal Edueation; and we are of opinion that eompulsion of this sort, provided it be not too detailed, may very properly and expediently be made part of a eode of general regulations. The knowledge at present required as minimum qualifieation for entering upon praetiee (in addition to the proofs of preliminary edueation) may be elassified under three heads, as follows:—first, eertain general seientifie knowledge; seeond, anatomieal and physiologieal knowledge; third, pathologieal and praetieal knowledge:—the first, as to Botany, Physies, Chemistry, and, if the University of London is the examining board, Zoology; the seeond, as to Anatomy, topographieal and struetural, and Physiology with Physiologieal Chemistry; the third, as to Pathologieal Anatomy, Pathologieal Chemistry, Prineiples and Praetiee of Medicine, Prineiples and Praetice of Surgery, Prineiples and Praetiee of Midwifery, Pharmaey, Foreusie Medieine. It would, we think, be a proper eompulsory prineiple, that the student should not be allowed to eount study in the seeond of these divisions till he had shown himself profieient in the first, nor to eount study in the third till he had shown himself profieient in the seeond. Also, the least number of years (say four) whieh a student is required to give to medieal studies, might so far be eompulsorily allotted in divisions, that the third examination should not be permitted till two years after the second, nor the seeond till one year after the first.

Whether any general regulations beyond such as the above can conduce to the real success of Medical Education seems to us extremely doubtful. Any one who will consider, for instance, what total of subject-matter has to be treated under the two heads of Anatomy and Physiology, will see that the total might be very differently divided in two different schools, and yet be equally taught in both. Still more, any one who will consider what total of subject matter has to be taught under different heads of pathology and practice will see, first, that a division of systematic courses of lectures into the five sections of Materia Medica, Medicine, Surgery, Midwifery, and Forensic Medicine, is by no means the only division which could be deemed reasonable; and secondly, that even the total of systematic courses might be of very different magnitude in two different schools according as departments were more or less developed for various sections and subsections of clinical instruction, for Practical Pharmacy, for laboratory analysis, &c. &c. These are details in which it would seem best, not that all schools should be subject to one rigid rule, but rather that all should be as free as possible to choose the particular machinery wherewith honourably to compete for the character of giving good education. A well-manned school, put on its mettle, might be expected to improve very greatly on many present arrangements; especially by the lecturers concerting that their courses, both in extent and in succession of parts, should properly fit into one another, instead of being (as now) almost independent performances, with a vast deal of overlapping and repetition, and sometimes not a little mutual contradiction. Of the valuable suggestions recently made by Dr. Parkes for the improvement of Medical Education, many in our opinion are not suitable matter for universal central regulation, but are eminently such as might be realized in schools competing with one another under a system which should leave to them for all minor matters the largest possible amount of free action.

VII.—If then we assume that the knowledges to be required from the candidate for minimum qualification in the profession are still to be, in kind, those which the present London regulations purport to require, our curriculum, briefly stated, and subject to reasonable provision for exceptional cases, would be this. The examinations to be passed by the candidate would in all be at least four in number;—first, in common preliminary education, which should include Botany, and Elementary Chemistry; second, in Chemistry, Physics, and the Anatomy of bones, ligaments, and muscles of the human body; third, in Anatomy and Physiology, (including the necessary illustrative portions of Physiological Botany and Zoology), and Materia Medica; fourth (which might perhaps have to be subdivided), Medical and Surgical Anatomy, Pathology, State Medicine, and the several departments of practice. To the fourth examination he would not be admissible till at least two years after the third, nor to the third till at least one year after the second, nor to the second till at least one year after the first. Thus his four years would

have been used methodically. To the first and second examinations he would be admissible on the principle of "free studentship"—*i.e.* without being required to adduce evidence of having learnt in any particular way, or in any particular establishment. Chemistry, Physics, and Botany, would in this respect be on the same footing as English and Latin and Arithmetic. For admissibility to the third examination he would have to produce a certificate from "recognized" teachers that he had for at least one year, since the date of his second pass, studied Anatomy and Physiology under their direction, according to the method of their school, and had done so to their satisfaction. Similarly, for admissibility to the fourth examination, he would have to produce a certificate from "recognized" teachers that he had for two years, since his third pass, studied the subjects included in the examination under their direction, according to the method of their school, and had done so to their satisfaction; and for this examination he would also have to show that he had attained the age for legal responsibility. Whether the final examination should, to complete it, involve some sort of recapitulatory examination in matters of previous passes, is *à priori* doubtful; but we incline to recommend that at any rate it should not generally do so with the minuteness of the original examinations.

VIII.—Securities for the proper working of such a system as the above may be looked for in three different directions: first, namely, in the guardedness, of "recognition;" second, in the efficiency and strictness of examining boards; third, in the legitimate competition of schools; but it is on the second and third of these influences, and especially on their conjoint operation, that we would almost unreservedly rely. Each of three points, however, requires to be separately considered.

1. As regards the "recognition" of schools, we have already suggested that this discretion ought to be vested in the General Educational Authority, rather than in a number of unconnected corporations, and we would wish to see it exercised in the most liberal spirit. We of course know that, if schools are over-numerous, those who conduct them must be proportionately ill-paid; but any direct restriction of numbers is impossible as regards the claimants of recognition, and to attempt it would contravene first principles of public policy. The only right and possible restriction on numbers is to make sure by indirect ways that ill-conducted schools shall not be commercially profitable: for, if this result can be attained, such schools will have no inducement to arise, and the supply of good schools will numerically adjust itself to the demand. In this respect it would be a great gain that compulsory regulations should not, as now, artificially force the multiplication of lectureships. And though Mr. Rivington's proposal, that certain branches of the curriculum should not be taught in separate medical school but only in one central establishment, is of a sort which in our opinion lies far beyond the province of direct regulation, we would gladly see schools left in greater freedom than

they virtually now have, to make such voluntary arrangements as would tend more or less completely to realize Mr. Rivington's object. We would propose that the recognizability of medical schools should be divisions corresponding to the divisions of examination,—that a school should be recognizable as a School of Pathology and Practice, or as a School of Anatomy and Physiology, or as both. A school applying for recognition in either capacity, or in both, would have to show itself, to the satisfaction of the Authority, possessed of all requisite means and organization for properly teaching whatever it claimed to teach; and the Authority would also have to see, in some detail, that the instructional programme of the school thoroughly covered the ground in which students would be entitled to expect instruction. Some establishments might care only to act in one or both of the strictly medical capacities, for which alone "recognition" would be necessary; but others, at their own option, might also have their respective sections of preliminary science, which, for obvious reasons, if they were well-conducted, would no doubt still (though without compulsion) be the almost invariable resort of first year's students; and finally some few establishments (as is now the case with King's and University Colleges) might happen also to have common preliminary education attainable within the same walls as the scientific and technical education.

2. The most important aspect of the question of Medical Education is not as to the forms and processes which candidates shall go through, but as to the intellectual fruits which they shall ripen; for the forms and processes will sooner or later regulate and adapt themselves, to secure whatever results must be attained as the end and aim of the curriculum. These (broadly speaking) are such results as shall satisfy certain examiners: and whether the process of education truly gives fruit according to its programme, whether the knowledges nominally claimable of the student are knowledges really acquired by him, is an issue which will be mainly contingent on the mode in which examinations are conducted. We therefore cannot too strongly express our opinion that a lax or incompetent administration of this great trust is among the most grievous wrongs which can be inflicted on our profession and the public. Not only with reference to the ultimate aim of securing in the public interests that only well-qualified candidates shall recruit the ranks of our profession, but equally with reference to the mediate aim (now specially under our notice) of securing that medical schools shall be well-conducted, it is, in our opinion, of the very first urgency that nothing approaching to inefficiency should be tolerated in any board of examiners. It seems to us especially important that the examinations in scientific subjects should be such as to require a practical familiarity with scientific processes and manipulations, and an actual acquaintance with the objects (in Botany, Chemistry, &c.), classified and described. In the examinations in Medicine and Surgery it is no less necessary that the examinations should

in part be conducted in wards and out-patient departments of hospitals, and should be calculated fully to test clinical acquaintance with the characters and treatment of diseases, and with necessary medical and surgical manipulations. The result of the strict application of this rule to examinations would be to render teaching in schools and hospitals of necessity demonstrative and practical, and would tend to inforce regular attendance and systematic teaching in wards and out-patient departments. The reforms which we advocate depend so very much for their possibility on the confidence with which examinations can be regarded as adequate tests of education, that we are forced to insist on this point. We cannot conceive that public interests are properly cared for, where large permanent boards, with no distribution of subject-matter, conduct their whole range of examination equally by all their members: believing, as we do, that every subject which ought to be separately taught, ought also to be separately examined in, and that the examiner in each subject should represent as far as possible the very best special knowledge of the time. And we also think it very important that examiners should as far as possible be so appointed as not to have any pecuniary interest in the number of accepted candidates.

Here, too, we have to add another important qualification. We are of opinion that the controlling Authority ought to define with very much more precision than is now used, within what area of knowledge candidates for minimum qualification are to be examined, — to what exact extent in Chemistry, to what exact extent in Physiology, to what exact extent in Forensic Medicine, and so forth. We would insist that examinations should be thoroughly searching and strict within the area to which they purport to extend; and it is in order to this object that the examiner's requisition of knowledge should in the first instance be well defined. The present programme, unless it be understood with modifications which are not expressed in it, is, we think, too pretentious for its object. We cannot hope (much as we might wish) that every one entering upon practice in the United Kingdom shall have thoroughly mastered all the studies which are now nominally comprised in his curriculum, — all the Botany, Physics and Chemistry, all the Anatomy and Physiology, all the Forensic Medicine and Pharmacology, &c.; but if the requisition of the examining Authority in regard to each such subject-matter were defined in the manner we suggest, a really thorough knowledge within that more limited area might we think be made indispensable, and very advantageously be substituted for smatterings of larger pretension.

3. Subject to the above qualifications, we may now complete our scheme of securities. Schools, constituted as we have described, would be at liberty, under the described conditions, to present their students for examination: and the legitimate competition of schools – competition, namely, as to which of them shall show the best educational results, is the influence which

remains to be provided for. The course which in this respect ought, in our opinion to be taken, is to provide that returns from all examining boards should annually be made to the general Authority, and by this Authority be published : stating, with all such particulars as might conduce to exact comparison, what had been the proportions of pluck and pass in each class of candidates sent up by the several schools respectively. The public would thus have the best attainable means for forming its own conclusions as to the relative efficiency of each school : and as those conclusions would certainly in the main determine the prosperity of the school, so the interests of the teachers would be very directly identified with the merits of their system of teaching. And thus, in our opinion, Medical Education would be far more likely to improve than under a continuance of the present illusory regulations.

IX.—In concluding our Report it is perhaps desirable for us expressly to point out that the conditions of qualification to which it refers are exclusively those of minimum qualification for the profession, and that we therefore do not pretend to have exhausted the subject of Medical Education. We, on the contrary, think it incalculably important that persons entering the profession should to the utmost be moved by adequate inducements to continue their education far beyond the comparatively low point at which a standard of minimum qualification must be fixed; and in this point of view the conditions under which the various corporations confer their higher titular distinction, seems to us only of less public interest than the conditions of minimum qualification. It would, however, be beyond the limits of our commission to enter upon this subject, or to discuss educational provisions (such as of course every first-class school ought to contain) for licentiates who wish thus to extend their studies. And we only advert here to those branches of the general subject, lest it should in any degree be supposed that we have been unmindful of their great importance.

Summary of Recommendations.

The Association is of opinion that :—

I.—No Examining Board should grant a diploma authorizing medical or surgical practice, and entitling to registration, except after examination in all the subjects of Medical and Surgical Education necessary for what is now called the double qualification.

II.—Not less than four years of actual study shall be deemed sufficient prior to examination for a diploma.

III.—Such study must commence after the student has passed an examination in common preliminary education. The examination in common preliminary education should include Elementary Chemistry, and Botany, in addition to the subjects of ordinary education.

The four years of study should be thus divided:—

1st year.—Chemistry, Physics, and Anatomy of the bones, ligaments, and muscles of the human body.

2nd year.—Anatomy, Physiology, and Materia Medica.

3rd and 4th years.—Medical and Surgical Anatomy, Pathology, State Medicine, and the several departments of practice.

IV.—There will thus be four examinations for any candidate for a diploma.

1. The examination in *common preliminary education* to be passed prior to the admission to the status of a medical student.
2. An examination at the close of the first year of study in Chemistry, Physics, and in the Anatomy of the bones, ligaments, and muscles of the human body.
3. An examination at the close of the second year of study in Anatomy, Physiology, and Materia Medica.
4. An examination at the close of the fourth year in Medical and Surgical Anatomy, Pathology, State Medicine, and the several departments of practice.

V.—Students should be admitted to examinations I. and II. on the principle of free studentship.

VI.—They shall not be admissible to the third examination before the close of the second year of medical study; nor to the fourth before the close of the fourth year. And these three years shall be spent at a recognized medical hospital.

VII.—It is not desirable that the mode of teaching in the recognized medical schools should be strictly prescribed, but that considerable liberty of action should be allowed to them. No student, however, should be admitted to examination till the authorities of the school at which he has studied furnish him with a certificate that he has studied the subjects included in the examination under their direction, according to the method of their school, and to their satisfaction.

VIII.—Examinations in scientific subjects should be such as to require a practical familiarity with scictific processes and manipulations, and actual acquaintance with the objects (in natural History, Chemistry, &c.), classified and described. In the examinations in Medicine and Surgery it is no less necessary that the examinations should in part be conducted in wards and out-patient departments, and should be calculated fully to test clinical acquaintance with the characters and treatment of diseases, and with necessary medical and surgical manipulations. The result of the strict application of this rule would be to render teaching by schools of necessity demonstrative and practical, and would tend to enforce regular attendance and systematic teaching in wards and out-patient departments.

IX.—It is desirable that each subject which is severally taught should also be separately examined in; that the Examiner should represent the best

special knowledge of the time, and should be devoid of any pecuniary interest in the number of candidates passed.

X.—The range of examination in each subject should be more strictly confined than it now commonly is; and that range should be carefully observed by Examiners, exactness of knowledge being held preferable to a smattering over a wide area.

XI.—The Examining Boards should make returns (for publication by the Central Authority) of the proportions of pluck and pass in the candidates sent up by the several schools.

XII.—The above recommendations apply especially to the minimum or ordinary pass qualifications of Examining Boards.

Signed on behalf of the Association,

WILLIAM JENNER, *President.*

ROBERT BENTLEY,
BERNARD E. BRODHURST, } *Secretaries.*

London, January, 1869.

III.

THE SYSTEM OF MEDICAL EDUCATION IN NORTH GERMANY, AUSTRIA, AND FRANCE.

BY

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NORTH GERMAN CONFEDERATION.

The principle which runs through the entire system of professional education in Germany, and that of Medical Education in particular, are, firstly, a thorough preliminary education; secondly, perfect freedom during the student's university career; thirdly, very strict and searching examinations under the control of the State.

We propose to consider the system of Education under these three heads.

I. Preliminary Education.

The State provides that every child shall receive a certain amount of elementary education, and every parent is bound either to supply this himself, or to send his child to one of the Elementary Schools (Elementar-schule) which are under direct governmental inspection. No person can undertake the education of another child not his own, without satisfying the State as to his ability to teach.

At the age of nine, the lad may be admitted into a college (gymnasium), provided he possesses an elementary knowledge of German, Latin, Arithmetic, and History. These colleges are scattered over the whole country, there being several hundred in Prussia alone. The mode of teaching is uniform in all. Each college has eight classes; the sixth (sexta) being the lowest, the second and first being divided into two sub-divisions (secunda and ober-secunda, prima and ober-prima). The session of each class lasts twelve months, the two sub-divisions of the first and second being considered as separate classes. Promotion from one class to another takes place only once a year, and is determined solely by examination, in which at least a medium knowledge of every subject is required. The same system of teaching runs through all classes from the lowest to the highest, and thus each class is preparatory to the one immediately above it. The course is completed in about eight years, the youth having at this time completed his seventeenth year, and he is now required to pass an examination if he desires to enter a University.

The subjects required at this examination, which closes the period of

Preliminary Education, are the following:—(1) A thorough knowledge of German and Latin, which languages the student is expected to read and write with equal fluency; (2) a sufficient knowledge of Greek to enable him to read any author in prose or verse without preparation; (3) a general knowledge of History, and a more intimate acquaintance with the History of European nations; (4) French; (5) Mathematics, viz.—Geometry, plane and spherical, Algebra, including equations of the third order; (6) Elements of Natural Science, more especially experimental physics and chemistry; (7) the Elements of Logic. These seven subjects are compulsory, but in addition a youth may be examined in Hebrew (in case he should desire to study Theology), English, Italian, and other modern languages. The examinations are held twice in each year at Easter and Michaelmas, and are conducted by the professors of the several colleges and superintended by a Government Inspector ("Schulrath"), who regulates the entire educational system of a province.

A youth may be prepared at home if his parents desire it, until he is ready to enter the first class, but he must, as a rule, attend this class if he wish to be admitted to the final examination: under exceptional circumstances he may be admitted without doing so ("extra ordinem"). Having passed this examination, the student receives a Certificate of Maturity ("Maturitäts Zeugniss"), which enables the holder to enter upon any branch of study he may desire at any German University, and also gives him the right to serve for one year as a Volunteer ("Freiwilliger"), instead of being obliged to enter the army for three years, the ordinary period of Prussian military service.

NOTES.

Some Gymnasia have preparatory schools attached to them, which then take the place of the elementary schools.

The fee for each class at a Gymnasium varies from six to nine shillings for the half session of six months. The final examination entails no further expense.

For those who are to be engaged in after life in commercial or technical pursuits, other schools (Realschulen) are established, in which more attention is directed to Natural Science, Mathematics, and modern languages than to classics. The youths on leaving are required to pass an examination, and to obtain a certificate of maturity.

II. Before proceeding to consider the second or University stage in the education of the student, it may be desirable to point out that the German Universities are the real schools for the pursuit of special study, and not mere examining boards for testing knowledge obtained elsewhere. A Univer-

sity consists of four faculties, viz.—Divinity, Law, Medicine, and Philosophy. Each faculty is governed by a Dean, the University itself by the Rector. These officers are annually elected from the general body of the professors; the Deans being appointed by the members of their respective faculties, the rectors by the faculties collectively. The body of teachers consists of the Ordinary Professors ("ordentliche Professoren"), Extraordinary Professors, Lecturers ("Privatdocenten"), and Lectors. Any student who has completed his regular course of study, and has graduated by examination in one of the faculties, may become a "Privatdocent" of one of the subjects included in the curriculum of that faculty, provided he receives the consent of the Senate of the University consisting of Rector, Deans, and University Judge (Universitäts-Richter). The body of "Privatdocenten" constitute a most important and peculiar feature in the University life in Germany, and as their success depends entirely upon their own abilities and industry, they are constantly stimulated to activity. The Extraordinary Professorships are usually given to distinguished "Privatdocenten," whose services the University authorities desire to retain and recognize, but for whom no chairs are vacant. Lectors are men, either graduated or not graduated, lecturing upon subjects which do not come within the University curriculum, and for which no chairs exist. The appointment of the ordinary professors is vested in the members of the faculty, but subject to confirmation by the Government. They are always certain of a moderate competency by virtue of the endowment belonging to the chair; but they also receive the fee paid by students, and this may in some cases amount to a very considerable sum. Professors of the more purely scientific branches of medical study—such as Anatomy, Physiology, &c.—are not expected to undertake private practice.

A student in possession of a certificate of maturity on entering a University, matriculates. This consists merely in placing his name upon the books, and signing the laws.* He thus becomes a "Civis Academicus," and ceases to be subject to the civil law, acknowledging allegiance only to the laws of the University. After he has declared what branch of study he intends to pursue, no restriction whatever is placed upon him, and he is left entirely to his own devices. For convenience, however, a printed paper is placed in the hands of the medical student, stating what the senate considers to be the best mode and order in which medical science can be studied. It must be remembered that this scheme is merely offered as advice, and the student is in no way obliged to follow it; the majority of students, however, naturally follow more or less closely the plan marked out by the authorities. The following is a scheme offered to a student commencing in the summer session; for a student commencing in the winter session the plans modified accordingly.

* The fee for matriculation is about nine shillings, and has only to be paid once in the student's life-time, as it entitles him to study at any University.

SCHEME OF STUDY FOR A STUDENT COMMENCING DURING SUMMER SESSION.

First Session (*Summer*).—Botany with excursions, Zoology, Chemistry, Mineralogy, Osteology; with perhaps some lectures on Literature, Classics, or Art.

Second Session (*Winter*).—Encyclopædia and Methodology (or a general view of Medical Science and the methods of studying them), Experimental Natural Philosophy, Anatomy with dissections, Physiology; with some lectures on more general subjects if desired.

Third Session (*Summer*).—Physiology, Histology, Organic Chemistry, Comparative Anatomy, Practical work in the Chemical and Physiological Laboratory.

Fourth Session (*Winter*).—Psychology, General Pathology, Diagnostic and General Therapeutics, Anatomy with dissections, Surgical Anatomy; with Cosmology or Meteorology if desired.—Preparation for the Examination (Tentamen Physicum).

Fifth Session (*Summer*).—Special Pathology and Therapeutics (corresponding to the English Science and Practice of Medicine). Surgical Pathology and Therapeutics, Materia Medica, Theoretical Obstetrics, the Art of Prescribing, Practical Pharmacy with visits to the Chemists shops (there is a special "Universität's Apotheke" where the students may study and receive instruction), Dietetics, some special branch of Physiology or Anatomy, History of Philosophy, Medical Classics.

Sixth Session (*Winter*).—Continuation of the courses on Special Pathology and Therapeutics (Medicine and Surgery), Morbid Anatomy with practical work in the Pathological Institute, Medical Clinique, Surgical Clinique, the Theory of Operative Surgery, Practice of Operations on the subject, Dressing and Bandaging both practical and systematic, Fractures and Dislocations, Diseases of the Eyes, Auscultation and Percussion, Recognition of the Stage of Pregnancy with practical demonstrations, Obstetric operations on the dummy.

Seventh Session (*Summer*).—Medical and Surgical Cliniques, Obstetric Clinique, Ophthalmology and Clinique, Mental diseases and Clinique, Pathological Anatomy with practical work, Surgical operations, History of Medicine and of Epidemics, Diseases of Women and Children and Clinique, Lectures on Mineral Waters and Spas.

Eighth Session (*Winter*).—Medical, Surgical and Obstetical Cliniques, Hygiene, or Public Health, Forensic Medicine with practical demonstrations, Toxicology, Lectures on Epidemics amongst the lower animals.

The term of study is required to extend over four years, and the student is obliged to be inscribed for at least two courses of lectures and one course of dissections in each session (such courses of lectures must, however, extend over the whole session), but no control whatever is exercised to determine whether he attends the lectures or not.

Notes.

The following minor details may prove of interest, as illustrating the methods of study adopted.

Lectures on Physiology are delivered every day for one or two hours during nine months in the year, and are always illustrated by experiments; the student usually supplements them by practical work in the Physiological Laboratory, with the Professor and his assistants.

Lectures on Anatomy are delivered every day for an hour, and are illustrated by recent dissections: during the summer, lectures on Comparative Anatomy, on Osteology, or on special organs are held. During the second year the student attends lectures and demonstrations on Topographical Anatomy, given either by the same or another professor. Students are not expected to attend the same course twice.

Botany and Zoology are often taught practically during the summer, and by lectures in the winter.

Chemistry is usually sub-divided into several courses, such as—(1) general or experimental, (2) organic, (3) analytical, (4) detection of poisons and adulterations. The majority of students do practical work in the Laboratory.

The Clinical lectures in Berlin or Vienna are given by about ten different professors; the majority lecture daily, and a student may select the subjects he desires to devote himself to.

The lectures on Medicine and Surgery are also held daily, during both the winter and the summer session; in Surgery the summer course is usually devoted to fractures and dislocations. Systematic lectures on the History of Medicine and the History of Epidemics form an important course which all students attend.

No dresserships or clerkships are held by the students; demonstrations on the former are given in the clinical theatre, and practical instruction in bandaging and operations is given, the students supplementing this by bandaging each other, or dummies.

The rule in all German Hospitals is that *post mortem* examinations must be made in all cases. Bodies left more than one day in the dead-house are employed for the purposes of dissection or operation, and this supply is legally supplemented by the bodies of all persons dying in workhouses or gaols.

The fees for courses of lectures vary from one to two pounds, for practical courses from two to four pounds; no special fee is paid for dissections, and no charge is made for subjects. The sons and brothers of all professors teaching at the University, or of those who have died, are exempt from all fees for lectures and examinations.

The following is a fair example of the manner in which an average student would arrange his work:—Commencing in the summer at from 6 to 7 a.m.,

and in winter at 8 a.m., usually with some practical course or demonstrations, he might work from 8 a.m. to 1 p.m., dine from 1 to 2 p.m., work again from 2 to 5 p.m., and then read at home for two or more hours.

Students rarely complete their studies at one University, but usually migrate from one to another to hear the best teachers on special subjects.

III. At the close of the second year the student is obliged to pass an examination called "Tentamen Physicum;" this cannot be passed before the end of the fourth session, and not later than the commencement of the seventh session. Without a certificate of having passed this examination no student can be admitted to the doctor's degree. The examination is conducted under the superintendence of the Dean of the Faculty, and by an examining board elected every year by the Minister of Education. The subjects are, Experimental Physics, Chemistry, Anatomy, and Physiology. The examination is entirely *viva voce*, and the standard is not so high as that required at the Staat's Examen. The examination of each student lasts one evening, and not more than four are examined by the board at one sitting. The fee amounts to about £2.

In the degree of Doctor of Medicine no other certificates are required except that of having been inscribed for four years on the books of the University, and of having passed the "Tentamen Physicum." Before proceeding to graduate, the candidate must cease to be a student of the University, and must be ex-matriculated, by which act he ceases to be a *civis academicus*, and becomes once more subject to the civil law.

Before his admission to the examination he has a sort of conversation on medical subjects, with the Dean of the Faculty, which is called "Tentamen." If this proves satisfactory he is allowed to proceed. The examination consists of three parts, viz., first, two written papers on Anatomy and Physiology; secondly, *viva voce* examination by four or five professors, on Theoretical Medicine, and on Natural Philosophy, especially on such parts as are in connection with medical subjects; and, thirdly, the thesis, which the candidate must declare has been written by himself, and which must have been submitted to the Dean before it is published; the thesis must be publicly defended by the author, who always engages two or three friends to oppose him, but any one, "*ex errona*," is at liberty to attack the views therein advanced. Formerly both thesis and discussion were required to be in Latin, now, however, German is admitted. The candidate is then admitted as Doctor of Medicine.

The possession of this degree, however, does not entitle any one to practice until he has passed another most searching examination—the "Staat's

Examen." This is being held during the whole session, from October to April; the examining board being annually elected by the Minister of Education. It consists partly of teachers in the University, and partly of such other medical practitioners as are known for their scientific ability. The President is always an outsider, appointed by the Minister, and to him the examinees can appeal in case of any unfairness on the part of an examiner. This examination has no connection whatever with the University, and is designed merely to convince the Government of the practical ability of the candidate, and to ensure the public against ignorance and incompetency. In order to be admitted, the candidate must prove—

1.—That he is a Doctor of Medicine—"*rite promotus*," *i.e.*, obtained by examination, after four years of study.

2.—That he has attended to vaccination, with practical instruction for a given period; the certificate may be given by any legally qualified medical man.

3.—That he has delivered at least four pregnant women.

No certificate of age is required, but the above regulations insure that the candidate shall not be much under twenty-one.

The fee for the whole examination is 60 thalers, or £9.

The examination is divided into five stages—"Stationen."

1.—Anatomical and Physiological Station, conducted by four examiners.

The Anatomical consists of three parts—the Osteological, the Splanchnological, and Neurological; the first two are merely *vivâ voce* examinations; the third is both practical and oral; it is usually taken after the candidate has passed through the Physiological station.

The examination is conducted as follows:—An urn is placed on the table before the examiner, containing a number of cards —"numbers"—upon which are written the subjects on which the candidates are to be examined. Each candidate on entering the room draws a number, and although the questions are limited more or less to the subject stated on the card, the examiners have considerable latitude allowed them.

The Osteological numbers are 16, viz.—

1, frontal bone; 2, occipital; 3, temporal; 4, sphenoid; 5, base of skull, internal; 6, base of skull, external; 7, superior maxilla; 8, inferior maxilla; 9, nasal cavity; 10, vertebral column; 11, pelvis; 12, thorax; 13, clavicle, scapula, and humerus; 14, fore-arm and hand; 15, femur and leg; 16, foot.

The Splanchnological numbers are 13, viz.—

1, eyes; 2, larynx; 3, heart; 4, liver, spleen, pancreas; 5, liver, stomach, and duodenum; 6, urinary organs; 7, male genital organs; 8, female genital organs; 9, cavity of cranium; 10, cavity of thorax; 11 and 12, cavity of abdomen, intra-peritoneal, and extra-peritoneal; 13, neck.

The Physiological is divided into two parts, Physiologieal proper and Histological.

The Histological numbers are 10, viz.—

1, elementary tissues of body ; 2, blood and lymph ; 3, horny and epithelial tissues, with their physiological properties ; 4, structure and physiology of teeth ; 5, cartilage and bone ; 6, fibrous and elastie tissues ; 7, lymph and blood-vessels, and minute structure of glands ; 9, membranes—serous, mucous and cutaneous ; 10, tissues of the eyeball.

The Physiological numbers are 20, viz.—

1, heart ; 2, eirculation ; 3, respiration, eonsidered both physiologically and ehemically ; 4, animal heat ; 5, respiration, eonsidered in relation to the nervous system ; 6, absorption and secretion ; 7, salivary and gastric digestion ; 8, biliary and intestinal digestion ; 9, food ; 10, urine ; 11, general physics of nerves ; 12, physiology of the central organs ; 13, physiology of nerves ; 14, general physies of museles ; 15, movements ; 16, voiee and speeeh ; 17, sight ; 18, hearing ; 19, proereation ; 20, development of the fœtus, embryology.

The Neurologieal portion of the anatomical station is conducted as follows: —The candidate draws, by lot, some part of the body, upon whieh he has to make a preparation of the nerves ; this he does in a closed room without any assistance, and he has then to demonstrate the part to the examiner, and he may at the same time be examined orally upon any part of the nervous system.

The station occupies from five to six days, and it is a *sine quâ non* that the eandidate pass this before he can be admitted to any further examination. In the other stations a candidate may, if rejected in one, pass on to another, and return again to that in which he failed to pass.

2.—Medical station eonducted by two examiners on different days. The candidate has allotted to him a patient, set apart in the examination ward of the hospital, and he has to examine him, make a diagnosis and indicate treatment, and then adjourn to the private room to write a commentary upon the ease. The patient is now plaeed under his charge for at least ten days, or longer, if deemed neeessary, the examiner attending daily to see the patient, at 8 a.m. and 6 p.m., and prescribing the requisite diet and medieine in the journal, which is kept under the eharge of the physician's assistant. In addition, he attends at 11 a.m. to go round the wards with the examiner, when he has to see different cases and examine them. If one of the patients dies he has to make the *post-mortem* examination, and write the report in his journal ; if necessary, another patient is allotted to him. The two examiners visit the hospital on alternate days. In eonelusion, the candidate is required to diagnose several eases amongst the out-patients, to write a number of formulæ for drugs named to him by the examiner, and to give the doses of a number of poisonous substances. This ends the seeond station.

3.—Surgical station conducted by two examiners in a similar manner to the last, but with certain additions, the candidate being examined on separate days, both practically and orally, upon—

1, fractures and dislocations; 2, bandaging, with practical demonstrations; 3, instruments and operations—these are divided as follows:—The candidate may be examined upon fractures of—1, lower jaw; 2, clavicle; 3, humerus; 4, fore-arm; 5, elbow; 6, thigh; 7, neck of thigh bone; 8, leg; 9, petella. And be required to reduce disloeations of—1, lower jaw; 2, shoulder; 3, elbow; 4, wrist; 5. hip; 6, knee and digits of hand and foot; 7, ankle.

The operations are—1, trephining; 2, ; 3, cataract; 4, artificial pupil; 5, extirpation of eyelashes; 6, amputation of breast; 7, paracentesis thoracis; 8, paracentesis abdominis; 9, laryngotomy and tracheotomy; 10, œsophagotomy; 11, Cæsarian section; 12, hernia; 13, phimosis and paraphimosis; 14, amputation of penis; 15, introduction of catheter; 16, castration; 17, polypus of nose; 18, lithotomy and lithotrity; 19, venesection; 22, operation of aneurism, amputation and exarticulation of—23, finger; 24, arm; 25, fore-arm; 26, thigh; 27, leg; 28, excision of shoulder; 29, elbow; 30, wrist; 31, hip; 32, knee; 33, ankle; 34, operation on bone; 35, tenotomy and myotomy; 36, squint; 37, stricture of urethra; 38, hydrocele; 39, varicocele; 40, plastic operation; 41, use of sutures; 42, ruptured perinæum; 43, harelip; 44, cleft pelate; 45, prolapse of uterus; 46, hæmmorrhoids and prolapsus ani; 47, extraction of teeth; 48, operation for false joints.

In both the medical and surgical stations, questions upon the value of mineral waters forms an important part of the examination.

4.—Obstetrical stations, including the Diseases of Women and Children, conducted by two examiners.—This station commences with the delivery of a woman, and the candidate has to wait until an opportunity presents itself. He has to write a full report upon the case, and to perform, under the eye of the examiner, any operations which may be necessary. He then attends the patient daily for nine days, and at the same time visits the wards with the examiner. After this he is required to examine and diagnose the stage of pregnancy in a number of pregnant women, and at the conclusion of this station he has to perform some of the most important obstetrical operations upon the dummy, usually five or six in number, and has to diagnose the presentations of the fœtus.

5.—The concluding station is intended to control the previous portions of the examination. It is conducted by eight examiners, two of these examining in Practical Medicine, two in Practical Surgery, two in the theoretical parts of Medicine and Surgery, in Forensic Medicine, Mental Diseases, Materia Medica, &c., and the remaining two in Anatomy, Physiology and Natural

Philosophy. This lasts only one evening, and terminates the "Staat's Examen;" only those are admitted who have passed through all the former stations. It may be added that it is at this stage that a large number of the candidates fail, and this may be taken as a test of the thoroughness of the examination.

The whole "Staat's Examen" occupies usually about four months, provided that a candidate be not rejected in any station, it may occupy six or even more months.

On taking an oath to obey the laws, to attend alike to rich and poor, and to practise according to the best of his ability, the candidate receives his diploma, which enables him to practise anywhere within the limits of the North German Confederation.

AUSTRIAN SYSTEM.

The Austrian system is, in all essential points, exactly similar, the "Staat's Examen" being also conducted upon the same principles. Medical men desirous of becoming Officers of Health are required to pass another examination, and to write at least three essays upon subjects connected with Hygienic and Forensic Medicine.

NOTES.

No medical man is permitted to dispense medicines except under certain urgent circumstances and according to certain strict regulations.

The apothecaries must be legally qualified; they are required to have been apprenticed for three years, to have served three more years as an assistant, to have attended the University, to have been engaged for a certain time in the study of Practical Analytical Chemistry, and, finally, to have passed a "Staat's Examen." They are debarred, on pain of losing their licence, from attempting to practise Medicine or Surgery, or from offering any advice upon questions relating to these subjects. They may sell drugs, as merchandise, to patients demanding them, but are not allowed to recommend them for special diseases.

Midwives—Hebammen—are educated in special schools—Hebammenlehranstalt—and have to pass an examination. Their licence for practising Midwifery is limited by very stringent regulations.

FRANCE.

The Freneh system corresponds in many respects with the German, but it is distinguished by a still greater number of examinations, ehiefly oral.

Partieular eare is taken to sclect the right men as teachers, and to afford every facility to the student to proseeute the study of Natural Philosophy. Quite recently the Minister of Edueation, M. Duruy, has induced the Emperor to publish two important deerees, upon this subject, the one entitled "Décret relatif aux laboratoires d'enseignment et à la création des laboratoires de rechcrche," and the seeond, entitled, "Décret relatif à la création d'une éeole pratique des hautes études." The motives which led to these decrees are extremely interesting and important, as will be seen from the following extracts eoneerning the teaching of Natural Seienee. M. Duruy states that "the concurrenee of great knowledge with the faculty of imparting it, in one and the same individual, is exceptional, and, therefore, it must be supported and eneouraged wherever it is met with, because the degree of eivilization of a eountry is enhanced and heightened by the possession of sueh men. It is therefore desirable to lend every assistanee in order that such men may be brought forward, and may be supported wherever they exist." In speaking of the study of Natural Seienee in medical schools, he says, "If Physies, Chemistry, and Natural History have the living man as their object, and if they advanee the study of that wonderful organism in healthy and diseased state, they form a part of the medieal seiences. The population of France is therefore interested in the progress of physieal science in this direction, beeause its power and its wealth depend in great measure upon their progress." In respect to Physiology, he says, "A scienee, Physiology, attempts to take the same position in the history of the seiences in this century, as that taken by Mathematics in the 17th, and by Chemistry, in the 18th eentury. It seems, therefore, desirable that chairs for that seienee should be founded even in sueh seeondary sehools as do not at present possess them."

In France there are three Faculties (Facultés), whieh have the right to eonfer medical degrees, viz., Paris, Montpellier, Strasbourg. To these three Faculties are attached twenty-five preparatory sehools (éeole préparatoire), which are divided between the faeultics as follows:—To the "Circonscription de la Faculté de Paris" belongs Rheims, Lille, Arras, Armiens, Rouen, Caen, Rennes, Nantes, Angers, Tours, Poitiers, and Limoges.

To the eireonseription de la Faculté de Montpellier belong Bordeaux, Toulouse, Marseille, Algcr, Grenoble, and Claremont.

To that of Strasbourg belong Lyons, Dijon, Besançon, and Naney.

The teaehing body eonsists of twenty-seven professors in eaeh Faculté, and a number of agrégés, the latter forming a body of assistant professors,

doing the work of the department in the absence of the principal, and being largely employed in private teaching, they correspond in some measure to the Privatdocenten of the German Universities. Before any one is appointed to a Professorship, the greatest care is taken to ascertain his ability as teacher. There is, however, seldom much difficulty in doing so, as it is almost necessary for him to have served for some time as agrégé before his promotion. The agrégés are elected after public competition—concours—by at least seven judges, who are themselves appointed by the Minister from amongst the members of the Imperial Academy of Medicine. Men related to one another or to any one of the candidates cannot sit on the same concours, and any judge who fails to attend one of the meetings ceases to hold office. The subject to be treated on is drawn by lot, and an essay is written upon it in a private room in presence of one of the judges; five hours are allowed for the composition, and it is then publicly read by the candidate. He then draws by lot some subject, and after a preparation of three hours in a closed room, he is required to deliver a lecture upon it for at least three-quarters of an hour. And, lastly, he is required to discuss some medical subject after twentyfour hours preparation, and to support his views by arguments against any opponent who chooses to present himself; or a patient is brought before him, and, after five minutes' examination, he is required to lecture upon the case for at least half an hour. Finally, each candidate has to compose a thesis and argue upon it with one of his competitors. The agrégé receives a salary, and is allowed to hold private classes in his own department.

The medical men are divided into graduated ("gradés,") and non-graduated ("officiers de santé"); the latter qualification is rarely taken, except by persons in a lower station of life, by chemists and druggists, or by holders of foreign degrees, who do not wish to graduate in France. We shall therefore treat more fully of the gradés, as representing the rank of the medical profession in France.

The curriculum extends over four years, an inscription being made every three months, so that sixteen inscriptions are required in the entire period.*

	FRANCS.
* The fee for each inscription is 30fr., making for the whole sixteen inscriptions	480
A fee is charged when a student enters for an examination, and is not returned if he fails to pass, with the exception of those required for the certificate of aptitude and for the diploma, these are returned. A student not answering to his name when called up for examinatiou loses the fees he has paid.	
The fees for the "examens de fiu d'année" are 30fr. for each, amounting to	90
The fees for the "examens de reception" are—	
1. For each of the five first examinations the fee is 50fr., and 100fr. for the 6th, or thesis	350
2. For the certificates of aptitude for each of six examinatious, 40fr. ...	240
3. For the diploma	100
Total	1,260

Before entering the Faculté the diploma of "Bachelier ès Lettres" must be obtained by the student from one of the "Facultés des Lettres" in France, of which there are seventeen. The subjects of the examination for this diploma are Latin, Greek, French, Logic, Psychology and Philosophy, History, Algebra, Geometry, Chemistry, Physics and Natural Philosophy.

It is optional with the student to pass his examination for the diploma of "Bachelier ès Sciences," or to wait until the end of the first six months. He must, however, obtain this diploma from one of the "Facultés des Sciences," of which there are the same number as those of literature, and in the same towns. The subjects of the examination are Natural Philosophy, Chemistry, Modern Languages, and Philosophy.

The following plan of study is adopted by all students and is rendered obligatory by the character and number of the examinations.

First Year.—Medical Physics, Medical Chemistry, Anatomy with dissections, Medical Natural History, Physiology, and Histology.

Second Year.—Anatomy with dissections, Histology, General Pathology, Surgical Pathology, Surgical Clinique, Physiology, and Medical Pathology.

Third Year.—Dissections, Surgical Pathology and Clinique, Medical Pathology and Clinique, Operations and Bandaging, Obstetrics.

Fourth Year.—Dissections, Medical Pathology and Clinique, Forensic Medicine, Pathological Anatomy, Materia Medica and Therapeutics, Hygiene, and Obstetrics.

Besides these subjects there are faculties for practical work in the different laboratories, and special courses on skin diseases, eye diseases, syphilis, diseases of children, mental and nervous diseases, of the Urinary organs, &c.

All lectures, as well as all practical work, required for the degree are gratuitous, but fees are paid by the students at each inscription, and the cost of the entire education is therefore not much less than it is in Germany. The private instruction given by an agrégé must, of course, be paid for.*

At the end of each year the student has to pass an examination, and if he fails to do so he is debarred from making his next inscription, so that he

* RELATING TO THE EDUCATION AT THE PREPARATORY SCHOOLS FOR THE DOCTOR'S DEGREE.

Students can only make 14 inscriptions for the preparatory schools, and of these 9 are equivalent to 8 made in the Faculty,

10	„	„	9	„	„
11	„	„	10	„	„
12	„	„	10	„	„
13	„	„	11	„	„
14	„	„	12	„	„

So that, practically, all such students must make 4 inscriptions at the Faculty.

loses at least three months. These examinations are called " Examens de fin d'annéc." The subjccts are, at thc

End of the First Year—Physics, Chcmistry, Natural History—especially in their applications to Medicinc, Osteology, Syndesmology, Myology, and the clemcnts of Physiology.

Sccond Year—Anatomy, and Physiology in all its branches.

Third Year—Medicine and Surgcry.

At the close of the *Fourth Year*, in which the subjects of study are Clinical Medicine and Surgery, Obstetrics, Forensic Medicine, Pathological Anatomy and Hygiene, the candidate for the doctors' degree has to pass five examinations—" Examens de Reception," and is to defend his thesis. Of these examinations, the first includes Anatomy and Physiology, with dissections; the second, Medicine and Surgery, with operations; the third, Medical Natural History, Medical Physics, Medical Chemistry, and Pharmacology; the fourth includes Legal Medicine, Materia Mcdica, and Therapeutics; the fifth, Practical Clinical Medicine and Surgery in the wards of the hospital, with examinations and demonstrations in the *post-mortem* room. Each part lasts about two days. The public defence of the thesis concludcs the examination. Every stage is open to the public, and on each subject the candidate is examined by one professor and two agrégés; the thesis is discussed with two professors and two agrégés.

In addition to this test, every candidate for the degree, as well as those for the diploma of " Officiers de Santé," must pass through a pcriod of service called " le stage " in one of the hospitals in the neighbourhood of the faculty; the period of the " stage " commcnccs after thc eighth inscription, and continues until thc close of the sixteenth inscription, and during this period no inscription can be made without the production of a certificate from the Director of the Hospital or the medical officer under whom the candidate is serving, that he has discharged his duties to their satisfaction."

Those who at the annual cxaminations arc marked " cxcellent," or " very satisfactory," are permitted to select the hospital to which they would wish to be attached; the others are distributed.

When a student becomes an Externe or an Interne he receives a salary, and lives altogether in the hospital. Both these offices arc obtained by public competition (concours), and opcn to all comers. The cxamination for Externât consists in an oral description and demonstration of some anatomical and pathological subject, or of some subject in minor surgcry. The officc is held for three years, and only one inscription is necded to qualify a man for thc post. Only thosc who have filled the officc of Externe can prcsent themselves for thc concours for Internât, and thc candidatc must not bo more than twenty-eight years of agc, and must not have graduated. Tho examination for this part is both oral and written. The dutics arc held for a period of from two to four ycars; thc salary is 400f. for thc first ycar, and

500f. for the other three years, in addition to free board in the hospital. He is obliged to pass an examination at the close of every year whilst holding office. Both Externes and Internes are freed from serving the "stage."

The Diplomas of both Doctor of Medicine and Officier de Santé are received directly from the Minister, the Faculté merely having the right of recommending and proving the fitness of the candidate. On settling in any place, the medical man has to produce his diploma, and receive the sanction of the Prefêt.

Officier de Santé.

The Officiers de Santé have to undergo three years of study, and are only examined in practical subjects. No Officier de Santé is allowed to perform any of the more important surgical operations except under the direct supervision of a gradué.

Candidates, who have studied at one of the Faculties, are only admitted to the examinations "de réception" after having made twelve inscriptions, completed two years of "stage," and having undergone two examinations "de fin d'année." Before making their first inscription, they have to produce—

1st. Evidence of having completed their seventeenth year.

2nd. A certificate of moral character.

3rd. Authority from parents or guardians allowing them to enter at a medical school.

4th. A certificate of preliminary education from a director of a Lyceum extending over at least four years.

Before the candidate is admitted to the 5th and 9th inscription, he must have passed his 1st and 2nd examinations "de fin d'année" respectively. The subjects are the same as those imposed upon the candidates for the Doctor's degree at the corresponding examinations.

The requirements for the "stage" are similar to those for the M.D.

The examinations for the diploma are three in number, and include—

1st. Anatomy and Physiology.

2nd. Medicine, Surgery, and Midwifery.

3rd. Medical and Surgical Clinique, Materia Medica, and Therapeutics.

The latter consists of two parts—

1st. Written questions on Pathology, and prescriptions for three cases.

2nd. The practical examination of two cases, and questions upon them, both for Medicine, Surgery, and Midwifery.

The board of examiners consists of two professors and one agrégé, chosen by the Dean for each portion of the examination, and to these is added the Professor of General Pathology for the second part. A candidate rejected by examiners cannot present himself again till after three months study.

The Faculty can merely recommend the candidate to the Minister, who alone can grant the diploma.

Fees paid by the Officier de Santé.

	Frs.
The fees for twelve inscriptions	360
The fees for "Examen de fin d'année," thirty for each, for two	60
The fees for the Diploma Examinations—	
First Examination	60
Certificate	40
Second Examination	70
Certificate	40
Third Examination	70
Certificate	40
Diploma itself	100
Total	840

The "Officier de Santé" is only allowed to practise in the department for which he has received his Diploma; if he wishes to practise elsewhere he has to undergo some additional examinations. If an officier desires to obtain the Doctor's degree, the period of study which he has already undergone is allowed to count to some extent.

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APPENDIX III.

OBSERVATIONS ON MEDICAL EDUCATION.

BY DR. CHRISTISON.

June 30, 1869.

In forming an opinion as to the suitableness of the present system of Medical Education to fulfil its object, attention must be paid to the following objections which have been lately brought against it :—

1. That young medical practitioners of the present day are insufficiently acquainted with medical practice on receiving their licence to enter upon it.

2. That their unpreparedness is owing to their studies in medical practice, by hospital attendance and otherwise, having been too much interfered with by the simultaneous study of the preparative medical sciences.

3. That this inconvenient intermixture of studies arises from the systematic courses of instruction in the medical sciences by means of lectures having been too much extended.

4. That in the modern system of instruction in the preparative medical sciences, as well as in the teaching of medical practice, lectures have in most branches displaced practical study too much.

On ascertaining to what extent these complaints are well founded, it may be possible to find a remedy. But in the first instance impartial inquiry is needed before admitting to the full extent the charges which have been currently made on this subject during the last four or five years.

Every one acquainted with the class of men now in established possession of medical practice throughout the country, will bear testimony to the fact, that the medical profession, as represented by them, is in a satisfactory state, and especially that their qualifications and tastes are eminently practical. It will also be admitted that the public medical services present, among their members of such standing as to be known to the medical world in civil life, many men of great ability, and conversant especially with medical and surgical practice. Further, every one who has been long familiar with any of the great medical schools of the country will testify that they

annually supply numbers of able young men, thoroughly educated, and in particular with such an amount of positive practical experience as enables them to enter at once with justifiable self-reliance on the independent exercise of their profession.

These facts may well raise grave doubts whether, in the present system of medical teaching, there is really, as some insist, anything inherently hostile to the acquisition of practical skill, even during student life, or to the rapid acquirement of sound practical knowledge immediately afterwards. It may be reasonably surmised that the exceptions, which have given rise to something approaching a clamour against the present teaching of the schools, may be referred rather to suitable opportunities of instruction having been not duly taken advantage of by students, or not having been judiciously used by them, than either to an absolute want of them, or to a systematically unsound scholastic application of them. Neither should it be forgotten that some such exceptional cases may also be fairly referred, not to errors in school teaching, but to mistakes of the licensing bodies, who may have allowed the idle or the dull to slip too easily through their examinations.

Another consideration is that unfriendly critics of the schools may pitch too high their standard of qualification for young men fresh from school studies and examination. Many, owing to their talent, and peculiar opportunities of experience in professional practice, are all that can be desired. But a number of them, by no means trifling in amount, have not had these practical opportunities within their reach. Nevertheless it is matter of observation that such men, in civil life, speedily make up their deficiency by engaging in medical practice in various ways under the superintendence of established practitioners after examination; and in this way are soon enabled to enter the field of their profession with full responsibility. It is also worthy of observation that opportunities of instruction of this kind, and at this conjuncture, are so numerous that no young licentiate can fail to find them if he will give himself time.

There is one branch of the medical profession, however, in which there is frequently neither time nor opportunity for such a noviciate, and that is the public military services. When young men are intended for the Navy, Army, and India services, it has long been the custom to admit them at once to the special examinations of the Military Medical Boards after they receive their University degree or College diploma. In this way not a few candidates come forward inadequately experienced in medical practice. But were such men passed, it might be their fate to be placed immediately in a position, in which, with the charge of the health of large bodies of men, they are thrown upon their own individual resources for the discharge of their duty. The Military Medical Boards, well aware of this circumstance, are naturally more particular than the licensing Civil Medical bodies in their

examinations for admission into their several departments. It is evidently right that they should be so under the present system. But the fact that not a few young practitioners, licensed as such by the Universities or Royal Colleges, fail to pass the examination of a Military Medical Board, is not always proof that the Civil Board erred in passing them. Were the military authorities to provide, as they can easily do, opportunities for their medical candidates studying medical practice for an adequate period in military hospitals, before undergoing examination for entering upon service, there can be little doubt that far fewer instances of rejection would be met with than of late, and an order of practitioners would be created who might be trusted at once with the responsible charge of soldiers and seamen.

For a good many years military surgeons elect have been subjected for three months or more in military hospitals to instruction in things pertaining specially to military service, after they have undergone admission to it by special examination. But how much more rational it would be to receive them by simple nomination, upon certificates of legal qualification, acquirements, and character, to set them to study for three or six months in military hospitals, and then to subject them to special examination for admission into the Service. Nor is it only a deficiency in practical knowledge and experience which would thus be supplied. If a mistake be occasionally committed by a Civil Licensing Board in passing young men who are wanting even in preliminary literary and scientific training, or in familiarity with the fundamental medical sciences, the want might be discovered in time to be made up, or the candidate would have the opportunity of withdrawing.

Too much importance therefore must not be attached to the annual Returns of the Military Medical Boards, as published in the Minutes of the General Medical Council. The details show occasional carelessness on the part of the Civil Licensing Boards. They also point, when sifted, at the possible improvement of the system of military medical instruction and examination. But they are far from absolutely proving, as some will insist, a serious fault in education at the medical schools of the country.

Setting aside the Returns of Examinations by the Military Medical Boards, there are no sound facts on an adequate scale to bear out the complaint that newly-licensed practitioners are insufficiently educated. Individual cases to that effect, and which do not admit of doubt, have been quoted from time to time. But they have not been so numerous as to justify the clamour which has lately arisen against the present system of Medical Education; and moreover, were the circumstances of these cases capable of scrutiny, it is not improbable that their causes would prove to be very different,—viz.: Idleness during student life, or carelessness on the part of the Examining Boards of the licensing bodies.

The outcry, then, which has been raised against Medical Education in this country, rests on an insecure foundation. On the whole it is well that the Medical Council be wary in falling in with that cry. It is a serious matter to be over-meddlesome in interfering with systems of education, which have been established at various schools, not so trammelled by impassable lines as to be unable to mend their errors, and adapt themselves spontaneously to the novelties and improvements of the day. Different systems prevail at different schools. Under each system excellent candidates are annually sent into the profession. He is a rash man who should pretend to be qualified, whether by impartiality or knowledge, to pronounce which system is in all respects the best. Let the Council therefore endeavour to find out what is most praiseworthy in each, and productive of the best results. Let flagrant errors be pointed out, if there be such. But let the Council above all things beware of attempting to shape all medical schools with plumb and square, in pursuit of the phantom uniformity. The Licensing Boards have hitherto shown no backwardness in listening to the information and advice of the Council towards the better fulfilment of their duties to the public. There is no reason to fear that the Schools will be less so, if the Council be equally careful and cautious in their new inquiries and recommendations, as in their past proceedings.

Keeping the preceding considerations in view, it will, nevertheless, be found on inquiry that the education of the schools, however fruitful in results, is not so productive as it might be made.

The subjects comprised in a course of Medical Education may be arranged in two divisions. The first communicates preparatory scientific instruction; the second practical experience. In the latter are included Clinical Medicine and Clinical Surgery, with some separable branches, especially Clinical Midwifery. The former, or preparatory subjects, embrace in the largest acceptation of the term, Chemistry, Botany, Natural History, Anatomy, Physiology, Pharmacy, Pathology, Therapeutics, Practice of Medicine, Midwifery, and State Medicine. Most of the subjects in the preparatory or scientific division, and all those in the clinical division, may be taught either by lectures or practically; but they are best taught by a combination of both methods.

Now, in some medical schools lectures have been principally trusted to for imparting instruction; in others practical study; and, as a consequence, lectures have become too burdensome in certain schools, and in others too superficial. Again, in some schools fundamental scientific instruction has been most insisted on, comparatively little time being therefore left for acquiring clinical experience; while in others clinical attendance is considered all in all, and begins so soon that the fundamental medical sciences are comparatively neglected.

Able medical practitioners are sent into the profession by both systems; because many students learn in good time to correct the error of their school. But, as a general rule, the one class of practitioners, while better trained in the fundamental medical sciences, are apt to be at first unfamiliar with the features and treatment of disease; and they have to undergo a noviciate on that account after licence before entering upon independent practice. On the contrary, the other class, though more competent to enter at once into medical praetice on their own account, are often deficient in fundamental Medical Education, a want which is by no means easily supplied afterwards, and which is apt to prevent them from ever becoming conversant with the important bearings of the fundamental natural and medical sciences on therapeutics and the laws of health.

It is the business of the medical schools themselves, and, failing them, of the General Medical Council, to discover how each school may correct its errors by borrowing what is good from the others.

For this purpose the first object is to secure that the fundamental training in the medical sciences shall not be obstructed by the premature commencement of Clinical Study. Not only should the evident natural relation in point of time, between the two great divisions of medical study, not be reversed, as is sometimes done. They ought not to go on altogether simultaneously. It is of equal importance that scientific training shall not be disturbed in the beginning by clinical instruction, as that clinical instruction shall not be interrupted afterwards by scientific training. Complete separation of the two cannot be effected. During the middle period of Medical Education they must go on together, if the course of study is confined to four years. But there seems no great difficulty in attaining separation, both in the beginning of study, and for some time before its termination.

To this end nothing will prove more conducive than transferring, to the period of Preliminary General Education, those sciences which, forming at present part of a medical curriculum, belong equally to General Education, viz.: Chemistry, Botany, and Natural History.

Unfortunately it is not possible to enjoin that arrangement as a regular rule. For these three sciences cannot be efficiently taught without costly establishments of apparatus and collections, such as only the great schools of the country can afford to provide and maintain. Hence all intending medical students, who do not usually reside at the seat of a great school, were a course of instruction in Chemistry, Botany, or Natural History, rendered compulsory as a branch of Preliminary General Education, would be forced to resort for a special year to one of these schools; which would be equivalent to their being required to add substantially a fifth year to their four years of medical study, though under a different name. But there can

be no doubt of the great advantage to all students domiciled at the seat of a school where these three sciences are efficiently taught, were they to be made a part of General Education before strict medical study is begun. In that case provision should be made in the regulations of the Universities and Royal Colleges, that the studies count for the medical curriculum, although the time does not.

For such students it is a very easy matter to separate their scientific from their clinical studies. But even when the whole medical education of a student, in its largest sense, is confined to four years, it is possible to effect this separation to a much greater degree than is now commonly thought to be attainable.

The great difficulty generally represented to lie in the way is the undue number of lectures which, it is said, the student is required to attend in studying the preparatory medical sciences. This complaint, in the case of some schools, is probably well-founded in some measure, though not to the extent alleged. On the other hand, it admits of question whether other schools, in their zeal for reform, have not pushed the abbreviation of lectures too far.

Fifty years ago the subjects of lecture were comparatively few in number, and the courses were long, because very comprehensive. But now the subjects are much more numerous, and the relative duration of the old and new courses of lectures has not been suitably arranged. The history of medical tuition in this respect in the University of Edinburgh may serve as a clear example of what has taken place, more or less, at all other medical schools. About fifty years ago there were in this University only six courses of medical lectures, one of three months, and five of six months, in duration; and in the latter the number of lectures in a session varied from 120 to 140. But in 1825 the old professorships were found insufficient for the advanced state of medical science; they gradually underwent subdivision; some subjects entirely new were taught, and required for graduation; and thus at last, in 1833, the six courses of 1824 increased to twelve, three of the new ones extending to six months, and the three others to three months. In effecting these great changes two errors were committed: the original courses were maintained of their original length, although important offsets had been made from them; and through an ignorant punctilio on the part of the Crown, and the then governing body, the Town Council of the City, the new courses were made as long as the old. It is right to add, however, that a material curtailment has been since made in all the winter, or long-session courses; so that no course of lectures now extends over 105. But this curtailment has been much more than compensated, and most usefully, by an extension of the practice of class examinations, and still more of practical study in a large proportion of the professorships.

There can be no doubt that by these changes, which, as already stated, have been attended by similar changes at every great medical school in the country, very valuable improvements have been introduced into Medical Education. But nevertheless it cannot be denied that the subjects of study have become too crowded, that they interfere with one another, and especially that there has arisen a mutual interference between preparatory scientific training and classical instruction.

In most schools an attempt has been made to correct the evil which has thus arisen by curtailing the number of lectures in almost every course of oral instruction. At some schools the reduction has been carried to an extreme length. Certain reformers in this direction have reduced the number of lectures to 60 or 50 for the wider subjects, and to 40 or even 30 only for those of less extent. There have not been wanting advocates of retrenchment even to maintain, that, for the study of some of the preparatory medical sciences, it is better to have no lectures at all, and to trust entirely to practical instruction. But great mistakes have been thus committed.

In all the most successful of the great medical schools, abroad as well as at home, instruction, in the most prosperous and most famous periods of their history, has consisted mainly of courses of systematic lectures by men eminent in the branches which they have severally taught. There is no instance of large bodies of medical students having been successfully educated in any other way. It may be true that individual students have been taught with success by a method akin to the tutorial system. But these are exceptional cases; and excellent reasons could be given, were it necessary so to do, why it is that students have never been taught with any measure of success in large bodies except when courses of systematic lectures, descending into considerable details, and of considerable duration, have constituted a large proportion of the means of instruction.

Therefore, when such a method of education fails to interest medical students, and to instruct them, the cause must be—not an error in the fundamental system, but some special fault in the way of carrying it out. Judging from actual experience three errors have been committed at different schools.

The first is that the staff of teachers may not possess the requisite ability to secure the attention and respect of students. This is a deficiency which may obviously be apt to arise at the small medical schools, which, under encouragement from most of the Licensing Bodies, have arisen in all parts of the country within a few years. Even in the great schools of the kingdom, whose celebrity attracts teachers from all parts, it is sometimes difficult to obtain teachers of due ability to fill vacant offices. But in schools with only a small number of pupils, and without liberal endowments, and which consequently never can become an object of attraction to able teachers, a

complete staff of such teachers is plainly an impossibility. It is no wonder then that in schools of this class students should pursue their studies with apathy, or fall into idleness, or that they should in after life decry the system under which they had been trained. This deficiency can be corrected only in one of two ways. Either the right of qualifying for examination by the Licensing Bodies should be withdrawn altogether from the small medical schools; or, what may be thought more acceptable, the privilege should be restricted in their instance, so as to render them secondary schools, teaching only certain suitable subjects, or qualifying the student for only a part of the regulated period of study. In either of these ways valuable secondary schools may be created, where the ambition of creating primary schools has wrecked a laudable, but mistaken enterprise.

A second fault has been the undue abridgement of courses of lectures. In obedience to the recent outery against too much lecturing, the courses of oral instruction at not a few schools have been so shortened and mutilated as to fail in their primary object. It is pretended by over-zealous reformers in this line, that the proper business of a lecturer in a systematic chair is simply to teach the principles of his science; that he may do so in a short space of time, if he avoid superfluous particulars; and that details and illustrative applications may be left to the practical teacher, or to the student's own observation. But in no other professional education is that system followed. Nor is there anything so peculiar in Medical Education as to require such peculiar treatment. And what has been the result of it when it has been tried? Simply that lectures consisting only of principles, and stripped of due details and illustrative observations, become dry, uninteresting enunciations of generalities, unattractive to students, and powerless to fix their attention. Every observant teacher of experience must have noticed how hard it is to command the attention of his pupils for any length of time while he is dealing with abstract propositions and statements of a general nature, and how their interest is at once manifest when he proceeds to co-ordinate details, and illustrative or argumentative facts. Confine the lecturer to principles and general statements alone, reduce the number of his lectures so that he can admit little else into them, and it is then easy to understand how students should tire of attendance, steal from the class-room before the lecturer is done, and complain in the weekly London journals of the hardships they undergo. It is also not difficult to see, why an eminent London surgeon has lately had to represent that certificates of attendance on lectures are "a sham." In a school so organized, indeed, the student is really much to be pitied. If courses of lectures are cut down to such a standard, a serious question may arise whether systematic lectures, on several subjects at least, should not be cut down altogether, as some daring innovators have actually ventured to recommend, though on somewhat different grounds.

The third fault is that at some schools the systematic courses of lectures are, on the contrary, too long, either absolutely or relatively, so that they jostle either one another, or the courses of practical instruction on the same subjects, or, worst of all, clinical instruction. By most reformers of the present day this is regarded as the only real error. It is certainly not the only one. But it does exist, is a very serious fault, and ought to be corrected.

Some have proposed as a remedy that a fifth year should be added to the four now required as the minimum for the duration of professional study. Many students now extend their course of study to five years, and this extension is of great consequence to all who can afford to do so. But if five years of study were required of all students intended for the ordinary, as well as for the higher, branches of medical and surgical practice, a serious risk would be incurred of increasing too much the cost of education for a profession which already, in relation to the expense of preparation for it, is by no means too highly remunerated. Besides, the addition of a year to the present duration of medical study would not at all provide necessarily against the crowding and jumbling of lectures, if they are left ill-assorted in relative extent.

The remedy which will most naturally occur to a superficial reformer is simply to shorten the systematic courses of instruction. But great caution must be observed in applying this corrective. Whatever may be said against systematic lectures, let it not be forgotten that upon them, together with due practical instruction in their several subjects, depends the scientific character of our profession, and its distinction from a mere trade. By carrying abridgement too far this distinction will be more or less lost. Further, from what has been already stated above, there seems great risk that by such procedure lectures may be made so jejune as to lose all attraction and usefulness.

There is a third measure, however, which, although it has not come before either the schools or the Licensing Bodies, or even writers on reform in the journals, seems to promise better than any other to secure due attention to practical instruction in every important branch of medicine, and especially to clinical instruction, without impairing the standard of preparatory, systematic, scientific study. This is to regulate anew the relative length of each course of lectures, according to the extent of the science or sciences treated of in each, and having regard to the sub-divisions which have taken place in several branches of medical instruction during the last thirty or forty years.

Great difficulty will be experienced in accomplishing that change under the practice now universally followed, of a long winter session and a short summer one. But the object in view may be gained by

altering these to two equal sessions of four months each, with an interval of one month between them. The lectures on Chemistry, Anatomy, and Practice of Physic, will gain by being extended through two such sessions. All other subjects, now taught by daily lectures for five months, or five months and a half, may be efficiently taught in four only. Every subject now taught in three months will be benefitted by extension to four. Educationalists there may be, who think that the student may be worked for five winter and four summer months continuously; and that five months of lectures are more suitable for certain subjects than either six or four. I am satisfied, however, that in the following scheme four months are sufficient for any branch which is duly arranged in relation to others; that students require the relaxation of a month in spring after four months of hard winter study; and further, that this interval is of great importance for carrying on the examinations of those prepared to undergo them, and without interfering with their studies during class-time.

It is undesirable to enforce a particular order of study, because on the one hand several branches of medical instruction may be taken suitably at various periods of progress, and on the other hand students arrive at a medical school variously prepared, and may regulate the order of their classes accordingly. But as the several subjects of study must be put down in some order or another, the following list is arranged according to the succession which will suit the majority of students. In this list are comprised those subjects of instruction only which have been hitherto recommended by the General Medical Council for the minimum course of study for all professional licences :—

1st Year—1. *Quadrimestre.* Elementary Chemistry & Practical Chemistry.
Anatomy and Practical ditto.
2. *Quadrimestre.* Medical Chemistry, and Practical ditto.
Anatomy and Practical ditto.

2nd Year—1. *Quadrimestre.* Physiology, with Practical Demonstrations.
Surgery.
Practical Anatomy.
2. *Quadrimestre.* Medicine.
Hospital Practice and Clinical Surgery.
Pharmacy, Dispensing included.

3rd Year.—1. *Quadrimestre.* Medicine.
Therapeutics.
Hospital Practice, Clinical Surgery, with Surgical Clinical Clerkship.
2. *Quadrimestre.* Midwifery.
Hospital Practice.
Clinical Medicine.
Clinical Midwifery.

4th Year—1. *Quadrimestre.* Forensic Medicine.
Hospital Practice.
Clinical Medicine.
Clinical Clerkship.
2. *Quadrimestre.* Hygiology.
Hospital Practice.
Clinical Clerkship.

Chemistry has become a science so vast in extent that, as a branch of Medical Education, it requires to be limited and defined. The principles of the science, and a sufficiency of inorganic and vegetable Chemistry, may be taught in a course of 75 to 80 lectures, delivered five days a week for four months. But the medical student requires also more detailed instruction in four professional branches :—Animal or Physiological Chemistry, Pathological Chemistry, Toxicological Chemistry, and Pharmaceutic Chemistry. The last of these will be best taught as a branch of Pharmacy. Toxicological Chemistry may be taught to any student previously trained in general Chemistry ; and taking it as a department of Medical Chemistry will relieve the teacher of Forensic Medicine and Hygiology, for an important object to be mentioned under that head. When the student is pursuing the study of Elementary and Medical Chemistry, it is essential that he do so not only by attendance on lectures, but likewise by practical observation and experiment ; and it is believed that in this way he may acquire, in two four-months' courses, as thorough a knowledge as can be attained in a curriculum of Medical Education lasting for four years. Those who think that he may also acquire during the four years a fair knowledge of the higher walks of either Mineral Analysis, or the Proximate or Ultimate Analysis of organic matters, show a very imperfect acquaintance with the nature and practice of such inquiries.

A proposal has been made that Medical Chemistry should be taught by a different teacher from him who teaches Elementary Chemistry. This is a dubious measure. The former should know exactly what his students have learned from their elementary course. Moreover, experience abroad has shown that a separate Chair of Medical Chemistry always degenerates into one of General or Systematic Chemistry.

The study of Medical Chemistry has been placed in the preceding arrangement in the first year of study. But a question may arise whether it would not be better to interchange the places of Medical Chemistry and Pharmacy, and to take the former in the second quadrimestre of the second year, and Pharmacy in the second of the first year.

Anatomy, in its modern acceptation, has never been taught throughout all its departments, even in a course of lectures extending to six months. Hence in not a few schools the course of "Demonstrations," formerly a mere

affix of Practical Anatomy, has been gradually made to relieve the primary course, and converted more or less to a systematic one. But the whole subject of the systematic lectures may be thoroughly taught in two courses of four months each ; and thus on the one hand the course of demonstrations may be re-converted into its original constitution, which was daily demonstrations of the work of the students in the practical rooms,—and on the other hand, a diligent student will not require to repeat attendance on systematic lectures, but may have his time appropriated afterwards more largely to Practical Anatomy.

The several departments of Anatomy may be variously discussed, but are all so sharply separable from one another, that it is easy to arrange them in two four-months' courses. But in the choice of topics to be prepared, and in the arrangement of them, each teacher may be safely left to his own discretion.

In the preceding scheme provision is made for three quadrimestres of Practical Anatomy. Almost all students take this much ; so that there is no difficulty in requiring it of all. At the same time, as no other subject is required to be taken for a longer period than two quadrimestres, it may be better to reduce Practical Anatomy to the same standard, leaving the student, as now, to his own choice as to increasing it.

Physiology should be taught with the aid of demonstrations and experiments. It may be gone through in four months effectually. As a branch of the Institutes of Medicine, it was formerly taught, along with General Pathology and Therapeutics, in five months and a half. There is, therefore, no reason, even in its extension since then, why it should not be discussed singly in four months.

Pharmacy is at present somewhat peculiarly circumstanced. Along with Therapeutics, it constitutes the subject called Materia Medica. In all the medical schools of Scotland Materia Medica comprises both branches ; and Therapeutics occupies the larger share of the two in the teacher's lectures. But in most of the schools of England the term Materia Medica is given to courses of lectures, which consist of little else than Pharmacy, and in which the subject of Therapeutics is either entirely left out, or occupies a very subordinate share of the teacher's attention. But Therapeutics is by much the more important branch of the two to the physician ; and therefore it ought always to be taught carefully. It is by no means necessary, however, that Pharmacy and Therapeutics should be united in the same course of lectures. On the contrary, they may be studied much better separately. Pharmacy, which teaches the natural history, description, and chemistry of medicines, together with the art of dispensing remedies, may be taken up by the student early, so early as even the first year of his curriculum of study. Therapeutics, consisting of the general and special actions of medicines, dict,

and regimen, and their uses in the treatment of diseases, can be cultivated with advantage only at an advanced period of study; and, in fact, when treated of fully in lectures on Materia Medica, students do not attend that subject till the third, or more generally, the fourth year of study. Accordingly, in all the medical schools of France and Germany, the two branches are taught by separate professors, under the titles of *Pharmacie* and *Heilmittellehre* in the latter country, and *Pharmacie* and *Matière Médicale* in the former. Thus in France Materia Medica means Therapeutics; in England, Pharmacy; in Scotland, both departments. A preferable arrangement is to abandon the old name Materia Medica, to split that subject into its two easily separable divisions, and to teach them separately from one another.

Pharmacy, in all its parts, may be well taught in four months. The natural history, description, and chemistry of medicines are best taught by a combination of lectures, demonstrations, experiments, and practical study, and may be gone through in the first three months. All that a medical man requires to know of the art of dispensing may be learned in the remaining month of the quadrimestre with a Pharmaceutic Chemist, or at an hospital or dispensary. In the order of study given above, Pharmacy is placed in the second year of study. But it may be taken perfectly well in the first, so that, as already mentioned, it may exchange places with Medical Chemistry.

Surgery may be thought, by some of those peculiarly devoted to it, to require more than a four-months' course of systematic lectures; and it admits of the branch of Operative Surgery being detached, so as to occupy the second period of a longer course. But in the first place the subject, in its largest sense, could not be advantageously extended through eight months; secondly, a four-months' course is long enough in relation to the time given to other subjects of equal importance and extent; and thirdly, it is advisable to clear the way at as early a period of study as is most suitable for the study of Clinical Surgery,—under which, moreover, a great part of Operative Surgery will be better taught than in a course of lectures on Systematic Surgery. On the whole there seems little doubt that an excellent course of instruction on the last subject may be delivered in a four-months' course of between 75 and 80 lectures.

Practice of Medicine, Surgery being thus provided for, may be begun in the second quadrimestre of the second year. It cannot be disposed of with any profit in four months. Fifty years ago, when less in extent than now, and when the course of lectures on it in the University of Edinburgh was continued for six months, the Professor could overtake only two-thirds of his subject; but by varying the topics in alternate years he went through the whole in nine months; nor was there any complaint on the part of the students of undue prolixity. In two quadrimestres the whole subject of

Systematic Medicine may be gone through satisfactorily, without separating, as is sometimes done at present for relief, certain of its sectional topics, for the purpose of making distinct courses of instruction of them.

Hospital Attendance may be also commenced in the second period of the second year. To commence it earlier is unadvisable. Fundamental scientific instruction will otherwise be interfered with, and will interfere with hospital instruction; a habit of careless observation is consequently apt to be acquired; nor can any one reasonably maintain that two years and a half of hospital attendance, however important that object may be, is too small a proportion of the four years, within which the whole circle of Medical Education must be capable of being completed.

It is of more consequence that hospital study should be made thorough, than that it should be increased during these four years. For this purpose the scheme of education now proposed provides that every student on commencing hospital attendance at a medical school shall attach himself to a Clinical teacher, beginning with Clinical Surgery. The advantage to a student of observing disease under the direction of a Clinical instructor, who gives both practical instruction and regular lectures, is incalculable, compared with the results of the loose practice still prevailing at some schools, where the student merely accompanies a physician or surgeon on his rounds, and is left to observe for himself.

But something more may be accomplished besides ordinary study under a Clinical teacher during hospital attendance. No young legally qualified practitioner will feel himself qualified in fact to enter on professional practice, unless he has some responsible charge of patients before receiving his qualification. Hence the great variety in fitness for their duties among young men just let loose from school and examination. The superiority of those who have acted as resident medical officers or clinical clerks, in an hospital, is most marked, on comparing them with their comrades who have not had these or other similar opportunities of practical instruction. There is no reason, however, why every student should not be enabled to study, for a short time at least, in the capacity of clinical clerk, or in some similar position. It may be shown that even at a populous school, unless the attached hospital be disproportionately small, a large proportion of the students may have an opportunity of acting as clinical clerks for three months each; and the rest may have equivalent opportunities at dispensaries, county hospitals, and with private practitioners during the autumn vacation. It is in this way, and this only, that will be removed the complaint now made, not without justice, that young licensed practitioners are wanting in familiarity with the mode of applying their knowledge in actual practice, and are thus apt to seem even worse educated than they really are.

Therapeutics, separated from Pharmacy, for reasons formerly given, may

be studied successfully in the student's third year, but certainly not earlier. When completely taught, it includes the general actions, both in the healthy and diseased conditions of the body, produced by medicines, heat, cold, and the various forms of electricity, food, drink, and regimen, especially exercise and climate, and the uses of these curative agents in the treatment of particular diseases. This subject, practically the most important of all branches of Medical Education, has nevertheless been much too little cultivated at many schools. But the mind of the medical profession has been lately awaking to this neglect, and to the necessity of remedying it. An interesting and efficient course of instruction may be given upon it in four months, and it will be given to most advantage not till attendance on lectures on Systematic Medicine has been at least half gone through.

Therapeutics having been studied in the first quadimestre of the third year, *Midwifery* will find its place naturally in the second quadimestre. This subject may be very well taught systematically in a four-months' course of lectures. Clinically it might be studied at the same time, or in the fourth year, or best of all, perhaps, during the autumnal school-recess; because as this branch of practical study involves frequent and prolonged loss of rest at night, it is apt to interfere with regularity in other studies during the day.

In the second quadrimestre of the third year Clinical Medicine may be attended for the second time, and then along with the clerkship in this branch.

State Medicine is the only systematic study which remains to be provided for. It thus falls to be undertaken in the fourth year, which is soon enough. Hence, with this single exception, the student may devote his whole time and attention during his fourth year to Clinical instruction. If a very full course of lectures on State Medicine be thought advisable, one of its branches, *Forensic Medicine*, may be taught in the first quadrimestre, and *Hygiology*, its other branch, in the second. But if the Chemistry of Poisons be made a department of Medical Chemistry, Forensic Medicine will be so much relieved that both branches may be gone through satisfactorily in a single four-months' course of lectures. Thus a great part of the fourth year of study will be left free for the pursuit of practical Clinical studies, by clerkship, or in some similar way, and either in Medicine, Surgery, or Midwifery, according to the student's discretion, and his special destination in professional life.

The Tabular Scheme of Education now discussed has been so arranged that the student has never more systematic subjects of lecture to attend at any time than two, and sometimes no more than one. Thus he has never

any oppression from too great varicty, and he has always amplc timc for practical study in the samc subjects, or in others, and for Clinical attendance as well as private study.

Suggcstions have been made in various quartcrs that additions may be made to thc curriculum of study hitherto regarded as thc minimum profes-sional education for gcneral practitioncrs. This curriculum has been so recently fixed that due caution must be obscrved in disturbing it too soon. An additional reason for caution is the complaints which have bcen made of its already too great comprehensiveness and variety. Nevertheless it may be possible to find, in such a schemc as that arranged above, room to introduce, even for a minimum education, one or two more branches of study without undue crowding. The chief subjects which have becn proposcd arc Botany, Natural History, and Morbid Anatomy.

Botany has a claim on thc attention of every well-cducated man, both on account of the information it communicates, and for the exercise of the mental powers derived from its cultivation. A limited portion of it is also necessary to enable one to recognize medicinal and poisonous plants, and their parts; and if a medical man ought to possess this knowledge, as is certainly desirable, there is no doubt that he will not acquire it unless he learns a great deal more of Botany. But whether a sciencc now so elaborate can be efficiently pursued by the generality of medical students,—by any except those who possess superior parts and industry to their fellows,—during a four-year's course of education, without danger of interfcrence with their more essential studies, is a scrious and difficult question to answer.

Natural History is similarly circumstanced. It is even more compre-hensive, while it has perhaps less prccise relations to medical and surgical practice. But it is desirable that every wcll-educated man should be acquainted with some branches of this science, and medical men especially will derive direct professional advantage from possessing some knowledge of Meteorology and Zoology. But it can scarcely be studied, except by the select class of medical students, in a four-year's course of instruction, without interfering with more strictly professional objects.

Were the medical student however to add, as some now do, a summer session before the beginning of his four-year's course of professional educa-tion, it is plain that both Botany and Natural History would be studied with great advantage and facility during a quadrimestre before those which have been arranged for study in the forcgoing tabular view. Still better would it be, were he to add two quadrimestres, or a whole school year, because in the first of the two he could study Chemistry and some branches of Physics. This ycar would thus bccome, in correct language, a year of Preliminary Gencral Education. But for reasons givcn above, it must be regardcd as if it were an additional year of medical study; for, call that year what we

may, the result is to add greatly to the duration and cost of education for the medical profession.

Morbid Anatomy is differently circumstanced. This is a purely professional branch of knowledge which has been greatly extended and methodized during the last forty or fifty years; and a growing desire has arisen that it should be required of all students as a separate subject of study. If any new subject is to be added to the minimum course of education, it has a claim prior to every other. At the same time it is well to consider whether the principles and practice of Pathological, or Morbid Anatomy may not be sufficiently studied, if the principles be taught, as now, in the systematic course of Practice of Physic, and practical study carried on during the long period of two years and a half proposed to be devoted largely to the pursuit of Clinical Medicine and Clinical Surgery.

The preceding observations would be incomplete without some reference to Examinations as well as to Tuition, simply because, after long experience both as a teacher and an examiner, it seems to me a duty to mention that the division of the Professional Examinations into several stages has not had the good effect which was expected from it. Students, who have studied the subjects necessary for their early examinations, are very apt to "grind," as it is called, in their past studies, while they are actually attending instruction in more advanced subjects, and ought to be studying, or "grinding," in these. The only practicable way to correct this evil, and secure steady attention to the progressive studies of the students, is to restore the single examination at the close of professional study, and in place of those now undergone at an earlier stage, to substitute examination on each subject at the termination of his instruction in each.

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